राज्य सभा के पटल पर रखे जाने वाले कागज
Papers to be laid on the Table of the Rajya Sabha
प्रमाणीकृत/AUTHENTICATED

(डा० अबरार अहमद)
(Dr. ABRAR AHMED)

सत्यमेव जयते

REPORT OF THE COMPTROLLER AND AUDITOR GENERAL OF INDIA

FOR THE YEAR ENDED 31 MARCH 1992

NO. 2 OF 1993

UNION GOVERNMENT (SCIENTIFIC DEPARTMENTS)

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Prefatory Remarks

1. This Report for the year ended 31st March 1992 has been prepared for submission to the President under Article 151 of the Constitution.

2. This volume covers matters arising from test audit of the transactions of the Scientific Departments of the Union Government, the Autonomous Bodies under the control of such Departments and some major scientific organisations under some other Departments.

3. This volume includes audit review reports on the following :

a) Central Pollution Control Board
b) Solar Energy Programme
c) Indian Institute of Petroleum
d) Central Building Research Institute
e) Central Mining Research Station
f) Central Mechanical Engineering Research Institute
g) Directorate of Purchase and Stores - Department of Atomic Energy
h) Indian Association for the Cultivation of Science

4. The cases mentioned in this Report are those which came to notice in the course of audit during the year 1991-92 and early part of 1992-93. The Report also includes matters relating to earlier years which could not be covered in the previous Reports. Matters relating to transactions subsequent to 1991-92 have also been mentioned wherever relevant.

Overview

Some of the major audit findings mentioned in this Report are summarised in this Overview.

Ministry of Environment and Forests

I. Central Pollution Control Board

The Central Pollution Control Board **(CPCB)** is the apex body at the national level for control of air and water pollution. It was not adequately empowered to discharge its functions effectively. The coordination between CPCB and the State Pollution Control Boards was also not effective.

Under the Pollution Control Acts, CPCB was to lay down standards for quality of water and air. Quality of pollutants discharged were to be regulated by the State Boards with reference to the standards developed. CPCB had not yet evolved any mandatory standards for water and air quality. It directed its efforts towards development of minimal national standards for trade effluents and sewage discharge which came under the purview of the State Boards and not CPCB.

In order to ascertain the quality of river consistent with human activities, CPCB planned to prepare an Action Plan to control pollution and maintain or restore the wholesomeness of river. In this connection, nine river basin studies were to be undertaken, completed and published by November 1988 to December 1991. However, reports in respect of only three studies had been completed (yet to be published), report on one study was under preparation, two studies were under progress and action was yet to be initiated in respect of the remaining three studies. Revised target dates for their completion and publication had not been set.

Under a project for water quality monitoring, CPCB installed two water quality monitoring stations, up-stream and down-stream of the river Yamuna in Delhi, in order to assess the pollution load generated by the city. However, the equipment was not compatible with the quality of water at the downstream station and consequently it could not function. It was shifted to an upstream location. This did not serve the objective of measuring the pollution load downstream of the river.

In another project for water quality monitoring, nine automatic monitoring stations were proposed to be installed in order to give an early warning to down-stream users of adverse water quality but, none of the four stations installed could be made functional.

Expenditure of Rs 115 lakhs was incurred on the coastal monitoring programme which was sanctioned in February 1987. The data collected upto April 1992 is yet to be analysed.

Under air quality monitoring programme, CPCB had initiated only preliminary work. Action towards prevention and abatement of pollution had not been initiated. Under a programme, CPCB proposed to instal three automatic air quality monitoring stations. None of the stations could perform well due to software and power problems and non-availability of trained manpower.

The programme for development of mobile laboratories could not be made operational even after three years of the investment of Rs 25.03 lakhs on procurement of chassis and equipment.

Publication worth Rs 18 lakhs were lying unused in stock since 1978-79 due to improper assessment of requirement, poor circulation and lack of action to create awareness among the users.

Assets worth Rs 48 crores received under foreign collaborative projects were not reflected in the accounts. During 1990-92, funds from collaborative projects to the tune of Rs 60 lakhs were diverted for other purposes.

(Para 4.1)

II. Irregular release of funds

For the site preparation for a computer to be installed and completely commissioned on turn key basis at the Forest Survey of India, Dehradun, memorandum of understanding with a firm was signed for execution of civil works for renovation of the site without consulting Civil Construction Unit of the Ministry or the Central Public Works Department. Some structural changes were considered essential subsequently for housing the system and the proposed changes were referred to CPWD for approval. CPWD who were not consulted initially,

expressed their inability to guarantee the load bearing capacity of the foundation. Finally, it was decided to shift the site which resulted in delay and idling of Rs 73 lakhs.

(Para 4.2)

Ministry of Non-Conventional Energy Sources

III. Solar Energy Programme

Solar Energy Programme consists of two components viz Solar Photovoltaic and Solar Thermal Programmes. The development strategy for the programmes included research and development **(R&D)** and extension and demonstration. The programme is implemented through the State Governments. The Ministry (a Department upto July 1992) after assessing the requirements of the State Governments, provide subsidy or enter into a cost sharing arrangement with the implementing agency identified by the State Government.

Under the **Solar Photo-Voltaic (SPV)** programme, four major applications viz street lighting, domestic lighting, community light and TV, and water pumping systems were identified for implementation.

An expenditure of Rs 69.11 crores was incurred on SPV programme during 1986-92 and 24611 street lighting, 11559 domestic lighting, 811 community light/TV, 860 water pumping systems were installed in the country. The results of an evaluation study, however, showed that most of the systems installed were not working mainly due to lack of proper maintenance, poor performance of the systems and apathy of the local users. In Uttar Pradesh, Orissa, Andhra Pradesh and West Bengal, the implementing agencies had not initiated any measures for proper monitoring of performance of the PV systems already installed and commissioned. Average failure rate of street lighting systems ranged from 33 to 100 **per cent**. The domestic lighting systems evaluated in four States indicated a failure rate ranging from 25 to 94 **per cent**. In five States surveyed in respect of water pumps, the failure rates ranged from 41 to 100 **per cent**. The low level of installation of TV systems showed that this was not popular with users. There were cases of improper site selection, overstocking, idle equipment/systems etc.

Under the SPV programme, an expenditure of Rs 13.18 crores had been incurred on R & D. Despite an elaborate procedure prescribed for monitoring these projects, their present

status and action taken on research results could not be furnished to Audit. However, test check of some projects revealed non-achievement of objectives, delay in completion and non-receipt of reports on completed projects.

The **Solar Thermal Programme** intended to demonstrate and promote use of technologies for conversion of solar energy into thermal energy. Major applications of the programme were solar cooker, solar water heating system, solar timber kiln, solar still/desalination and solar air heater. An expenditure of Rs 42.30 crores was incurred on the programme during 1986-92, out of which Rs 8.80 crores remained unutilised in ten States.

A 50-KW solar thermal power plant commissioned for R&D at a total cost of Rs 2.19 crores, was giving trouble from the beginning because of non-supply of critical components and spares. As a result, negligible amount of electricity could be generated and the plant has not been demonstrated successfully.

In respect of solar cooker programme in 11 States, there was substantial difference between sale figures given by the States and those available at the Ministry, resulting in payment of excess subsidy of Rs 40.08 lakhs during 1986-92.

There had been no sale of cookers in Assam, Arunachal Pradesh, Jammu & Kashmir, Karnataka, Nagaland, Tripura and Pondicherry till March 1992. Sales in Kerala, Manipur, Mizoram, Sikkim, Andaman & Nicobar and Dadar & Nagar Haveli had been very negligible.

In West Bengal, 1774 cookers had been distributed free of cost and reportedly beneficiaries were using them as box and mirror as no awareness for use of solar cookers was generated among the villagers.

4829 commercial heating systems and 10126 domestic heating systems had been installed in the Country upto March 1992. In many cases, the installations were not functioning properly due to technical problems, wrong site selection, non-maintenance and non-availability of water.

Cases of non-completion of projects resulting in infructuous release of grants or subsidy were noticed.

In respect of solar timber kiln and solar stills the Ministry could not furnish figures of targets. However, in

test check in States, it was noticed that targets had been set and the shortfall in achievements in respect of these applications was 17 to 100 **per cent** and 21 to 100 **per cent** respectively. Targets had not been met in the case of solar air heater also.

(Para 5.1)

IV. Injudicious release of funds

The Ministry released Rs 2.57 crores to Punjab State Electricity Board (PSEB) during March 1988-March 1989 for four mini-hydel projects without their detailed scrutiny. The work was not started till September 1991. These projects were cancelled by the Ministry in January 1992 and the amount of Rs 2.57 cores was refunded by PSEB in September 1992. No interest was paid by PSEB which would work out to over one crore of rupees.

(Para 5.2)

Department of Atomic Energy

V. Fast Breeder Test Reactor

Fast Breeder Test Reactor **(FBTR)** at the Indira Gandhi Centre for Atomic Research, Kalpakkam was initially planned to be commissioned by 1976 but attained its first criticality in 1985 with 22 fuel sub assemblies only which can give power upto 10 MWt. The reactor is yet to be loaded with 65 fuel sub-assemblies, to attain power at 42.5 MWt as was originally envisaged, even after 16 years. Against the estimated cost of Rs 34.85 crores, the expenditure has gone upto Rs 91.98 crores (March 1992). The likely date of completion and the final cost of the project are still indefinite.

Delay in commissioning of FBTR would in turn delay the 500 MWe Prototype Fast Breeder Reactor programme of the Department on which an expenditure of Rs 34.28 crores has already been incurred during 1985-92.

(Para 2.1)

VI. Primary Coolant Pumps

Primary Coolant Pumps are used to circulate heavy water through the core of the pressurised heavy water reactors. For indigenising manufacture of the pumps, concessions and undue benefits to the extent of over Rs 8.35 crores were given to an Indian firm, despite which only 19

components out of 37 could be indigenised. The indigenisation achieved was 30 per cent of the value as against 65 per cent envisaged.

(Para 2.2)

VII. Directorate of Purchase and Stores

Purchase

Over 2000 purchase files, relating to purchases worth Rs 248 crores, requisitioned by Audit were not made available. Audit scrutiny of the records made available, revealed irregular/avoidable expenditure of Rs 9.25 crores.

There were considerable delays in processing and finalisation of indents as well as procurement of stores.

Purchase orders were issued after expiry of validity of offers in 87 out of 90 cases and there were delays ranging from 120 days to over a year in 44 out of 90 cases. Delayed placement of purchase orders seen in test check involved extra expenditure of Rs 3.50 crores.

Customs duty exemption to the extent of Rs 4.47 crores was not availed of in respect of 307 cases due to non-completion of the formalities in time.

Stores

In some of the stores divisions, stock cards and registers of capital equipment were not maintained and return of balance of items issued as free issue materials not watched. Physical verification was not conducted in respect of some stores and 7181 discrepancies noticed during physical verification of some other stores remained unsettled.

Items worth Rs 36 lakhs were lying in stores for long periods. There was excess procurement of consumables worth Rs 45 lakhs in various divisional stores at Bhabha Atomic Research Centre (BARC). Total stock of 14,407 gms of pure gold was lying in Central Stores out of which 9286 gms were lying since 1965. Some inflammable items have been kept in stores for over ten years though some of these had been declared as surplus.

Outstanding advances with suppliers were not monitored properly. Advances of Rs 16.30 crores pertaining to the period 1977-87 were outstanding. Advance payments of Rs

44 lakhs were made to suppliers for supplies which could not be accepted due to defects. Neither have the defects been rectified nor have fresh supplies been made.

Ninety eight claims pertaining to the period 1986-87 involving Rs 209 lakhs were pending with insurance companies and 93 claims for Rs 15 lakhs were pending with Railways, transport carriers etc.

(Para 2.3)

VIII. Unutilised stores

Materials worth Rs 2.23 crores procured 10 to 15 years ago were lying unused at the Indira Gandhi Centre for Atomic Research, Kalpakkam.

(Para 2.4)

IX. Idling of equipment

Equipment costing Rs 1.88 crores, procured between December 1988 and January 1991, were yet to be installed. Equipment costing Rs 1.92 crores were installed after delay of three to five years. Further, equipment costing Rs 68.15 lakhs were issued to work after a period of 5 to 12 years of their receipt.

(Para 2.5)

X. Non-recovery of share of State Government in a project

Under a project "Radiation Treatment of Sewage Sludge" the Government of Gujarat was to bear one-third of the capital cost and one-fifth of the operation and maintenance cost during the R&D period. Rs 33.78 lakhs were yet to be recovered on this account from the State Government.

(Para 2.6)

Council of Scientific and Industrial Research

XI. Central Mining Research Station

Central Mining Research Station **(CMRS)** was set up in 1955 for providing R&D back up for improvement in productivity of Indian Mines.

Of the 29 in-house projects undertaken by CMRS during the Seventh Plan, none was completed. Out of 28 Grants-in-aid

(GIA) projects and 272 Sponsored projects undertaken during 1987-92, only 20 GIA projects and 115 Sponsored projects were completed. Though sponsored projects were to be fully funded by the sponsors, CMRS undertook 139 sponsored projects, during 1987-92, on partly funded basis resulting in loss of income of Rs 1.93 crores. Out of 557 consultancy problems undertaken, during 1987-92, only 420 were solved. CMRS did not realise fees from industries which resulted in financial loss.

Arrangement for transfer of technology and watching its utility for the industry was inadequate.

Irregularities were noticed in the purchase system. Stores valued at Rs 24.52 lakhs plus £ 77,287 remained unaccounted for a number of years.

(Para 12.1)

XII. Indian Institute of Petroleum

Indian Institute of Petroleum (IIP) was set up in 1960 as a national institute to provide technological back-up and trained persons required for the Petroleum industry.

Research Council of IIP had observed that the Institute should put in efforts in the ratio of 70 : 30 for relevance and excellence oriented projects respectively. However, IIP did not have a system to clearly define the category of the projects. Though sponsored projects were given more attention overlooking in-house projects, there were delays upto 27 months in completion of the sponsored projects and IIP was able to generate funds from sources outside CSIR only upto 17 **per cent** as against 30 to 40 **per cent** required under the CSIR guidelines. Notwithstanding the recommendations of the Research Council, no work on evolving standards for pollutants was initiated.

Monitoring and evaluation of research projects were inadequate and there was an absence of systematic information base for financial and technical monitoring.

During 1987-92, IIP had developed 24 products/processes out of which only seven were patented for commercialisation.

High value equipment were installed long after their receipt and Hydrocracker Pilot Plant was not made operational.

Number of training programmes organised and professionals trained showed declining trend during 1985-92 though training is an important activity of IIP.

IIP had assets valued at Rs 1509 lakhs as on 31st March 1992. However, these were not reconciled with the records of the concerned divisions/sections.

(Para 12.2)

XIII. Central Building Research Institute

Central Building Research Institute **(CBRI)** was set up in 1951 for carrying out R&D work on building materials and building construction.

Out of 100 projects undertaken during 1985-92, only 67 were completed. Of the total expenditure of Rs 25 crores, only Rs 7 crores were spent on completed or ongoing projects but no account of the remaining expenditure was available with CBRI. Five R&D projects were continuing well beyond their dates of completion for want of infrastructure and equipment.

A sum of Rs 56 lakhs was spent during April 1990 to June 1992 on 35-point Action Plan though the technologies taken up for the Action Plan were not different from what had been tried with the same group of beneficiaries, without success, during 1983-90.

Thirty four processes/technologies developed by CBRI were not accepted by the industries as these were already available with them and had become obsolete. The feed back studies indicated that the know-how developed by CBRI was not economical and did not upgrade the standard of the product. No back up/follow up action was provided by CBRI.

(Para 12.3)

XIV. Central Mechanical Engineering Research Institute

Central Mechanical Engineering Research Institute **(CMERI)** was set up in 1958 for development of Mechanical Engineering technology and to provide assistance to the industry in the form of feasibility studies research, training, consultancy etc .

Out of 61 in-house projects undertaken during 1985-92, only 26 projects were completed and 24 were dropped; analysis of three such projects disclosed unfruitful expenditure of Rs 22.49 lakhs. There was time over-run of upto 20 months on

four out of 11 ongoing projects as on 31st March 1992. There was no proper monitoring and evaluation of the projects resulting in non-achievement of objectives of the projects.

None of the 14 processes developed at a cost of Rs 73.22 lakhs was transferred to industry for commercialiasation.

Number of scientific papers published declined from 46 in 1985-86 to 16 in 1991-92.

Equipment valued at Rs 35.17 lakhs were lying unutilised for years due to non-installation and the works for which they were procured were hampered. Besides, equipment worth Rs 41.88 lakhs were awaiting inspection and lying unaccounted for and unused since 1989.

(Para 12.4)

XV. Unused facility

Sophisticated equipment costing Rs 66.70 lakhs procured by National Aeronautical Laboratory in June 1988 could be put into operation only in October 1990 as the required infrastructure was not ready.

(Para 12.6)

Indian Council of Agricultural Research

XVI. Inordinate delay in Frog-culture programme

Indian Council of Agricultural Research provided funds to Central Progrmme of Fresh Water Aquaculture (CIFA) for establishing a frog farm complex at Kalyani (West Bengal). The farm was not ready as yet though an expenditure of Rs 51.51 lakhs was incurred during 1987-92. Non-completion of the required infrastructural facilities prevented the scientific and other personnel deployed on the project, from being effectively and fully utilised.

(Para 10.2)

XVII. Infructuous expenditure

Indian Veterinary Research Institute procured a micro processor controlled ultra centrifuge in December 1984 at a cost of Rs 3.71 lakhs. Even after a further expenditure of Rs 0.28 lakh the equipment could not be put to use.

(Para 10.4)

Department of Science and Technology

XVIII. Non-realisation of results from socially relevant projects and infructuous expenditure

Under the scheme "Science and Technology Application for Weaker Sections", Department of Science and Technology **(DST)** sanctioned some projects to certain private bodies. These projects were shortclosed midway without achieving the objectives after spending Rs 10.82 lakhs.

In another case, three research projects which were funded by DST, were also shortclosed midway without achieving the objectives and the expenditure of Rs 6.68 lakhs remained infructuous.

(Para 7.3 and 7.4)

XIX. Excess release of funds

DST released funds to Technology Information, Forecasting and Assessment Council much in excess of actual requirements. Balance at the close of the years 1989-90, 1990-91 and 1991-92 was Rs 1.69 crores, Rs 2.44 crores and Rs 1.76 crores respectively.

(Para 7.5)

XX. Idle equipment

Two crushers procured by India Metereological Department at a cost of Rs 4.90 lakhs could not be made operational as the required infrastructure was not ready. As a result, work for which these were procured was hampered.

(Para 7.6)

Indain Council of Medical Research

XXI. Institute of Cytology and Preventive Oncology

Four equipment costing Rs 17.10 lakhs were procured by the Institute of Cytology and Preventive Oncology without clearance of the Scientific Advisory Committee. An equipment costing Rs 2.99 lakhs was purchased without the mandatory clearance of the Bhabha Atomic Research Centre. As a result, the equipment could not be used for nine years.

(Para 11.1)

Department of Ocean Development

XXII. Infructuous/Unfruitful expenditure

During November 1989- October 1990, Department of Ocean Develcpment (DOD) released Rs 51.50 lakhs to the National Geophysical Research Institute (NGRI) for research in Advanced Raman and photoluminescence spectroscopic facility for Oceanic and Mineral Physics. The project was shortclosed in March 1991 due to non-availability of suitable substitute of Project Investigator who had resigned in November 1990. Equipment worth Rs 18.40 lakhs procured for the project were still lying unused with NGRI.

In another case, DOD released Rs 8.91 lakhs during 1986-90 to the Central Institute of Fisheries Education for a pilot project, a prawn hatchery, which was to be completed by March 1989. The project had not been conceived well. Despite the adverse comments of the experts on the first progress report which was submitted in January 1989, the project was allowed to continue till July 1990 without any progress and the entire expenditure of Rs 8.91 lakhs remained infructuous.

(Para 6.1 and 6.2)

Department of Space

XXIII. Excess purchase of stores

Vikram Sarabhai Space Centre (VSSC) procured materials during 1975 to 1982 for the Satellite Launch Vehicle (SLV) Project. Though the project was completed in 1983, 1200 items valued at Rs 69.88 lakhs remained unused. There is a possibility of the items becoming obsolete and unuseable resulting in loss to Government.

In another case, despite 100 anodes costing Rs 3.28 lakhs procured in February 1988 being available in stock, VSSC imported 500 graphite rods costing Rs 2.47 lakhs in April 1988 which remained unused as these were no longer required due to conversion of the plant with titanium anodes.

(Para 8.1 and 8.2)

CHAPTER I

1.1 Introduction

1.1.1 The amounts expended on the Scientific Departments/major scientific organisations during the year 1991-92 and in the preceding two years are given below:

S. No.	Ministry/ Department/ Organisation	1989-90	1990-91	1991-92
			(Rs in crores)	
1.	Atomic Energy	1178.13	1206.31	1279.06
2.	Space	398.56	386.22	457.45
3.	Electronics	104.91	107.21	121.10
4.	Non-Conventional Energy Sources	110.68	111.76	128.85
5.	Bio-technology	53.82	59.35	64.03
6.	Science and Technology including Survey of India and India Meteorological Department	210.17	232.36	251.34
7.	Department of Scientific and Industrial Research (including grants given to Council of Scientific and Industrial Research)	232.79	239.03	258.08
8.	Ocean Development	31.21	32.71	39.83
9.	Environment and Forests including Zoological Survey of India and Botanical Survey of India	210.41	241.35	297.21
10.	Indian Council of Agricultural Research	252.71	306.48	328.60

11.	Indian Council of Medical Research	45.80	45.84	46.97
12.	Centre for Development of Telematics (Deptt. of Tele-communications)	18.53	21.16	25.80
13.	National Informatics Centre (Planning Commission)	42.80	38.85	41.12
14.	Geological Survey of India (Department of Mines)	83.02	85.85	91.18
		2973.54	3114.48	3430.62

1.1.2 Some of the significant achievements of the Scientific Departments during the year 1991-92 were :

- Public Liability Insurance (PLI) Act on Environment Policy came into force on 1st April 1991 and first set of Rules under the Act were notified on 1st May 1991.

- Unit II of the Narora Atomic Power Station attained criticality in October 1991.

- One stream of Heavy Water Project at Manuguru was commissioned.

- 1991 Kalinga award was won by an Indian scientist jointly with a Romanian.

1.1.3 Important results of the audit of public moneys expended in Departments of the Government of India and the Institutions controlled by them, which engage predominantly in the field of Science and Technology, have been given in this Report.

1.1.4 Accounts of autonomous bodies, which received grants and loans from the Ministries and Departments of the Government, are audited by the Comptroller and Auditor General of India under the provisions of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971. Audit Reports on their accounts are sent to them

and their controlling Ministries and Departments. As on 31st March 1992, accounts of the following 36 autonomous bodies receiving recurring grants from the Ministries and Departments of Government of India were required to be audited by the Comptroller and Auditor General of India:

S. No.	Ministry/Department Name of Body	Amount of grants received in 1991-92 **(Rs in crores)**
	Department of Atomic Energy	
1.	Tata Institute of Fundamental Research, Bombay	35.42
2.	Tata Memorial Centre,. Bombay	21.65
3.	Atomic Energy Education Society's School, Bombay	1.81
4.	Saha Institute of Nuclear Physics, Calcutta	6.16
5.	Institute of Physics, Bhubaneshwar	1.48
	Total	66.52
	Department of Electronics	
6.	Regional Computer Centre, Calcutta	0.51
7.	Centre for Electronics Design and Technology, Aurangabad	0.15
8.	Centre for Electronics Design and Technology, Srinagar	0.10
9.	Centre for Electronics Design and Technology, Imphal	0.39
10.	Society for Applied Microwave Electronics Engineering Research, Bombay	3.44

11.	National Centre for Software Technology, Bombay	2.31
	Total	6.90

Department of Environment, Forests and Wildlife

12.	Indian Institute of Forest Management, Bhopal	1.20
13.	Padmaja Naidu Himalayan Zoological Park, Darjeeling	0.18
14.	Wild Life Institute of India, Dehradun	3.41
15.	Central Pollution Control Board, Delhi	6.89
16.	Society for Promotion of Wasteland Development , New Delhi	5.71
	Total	17.39

Department of Science and Technology

17.	S.N.Bose National Centre for Basic Sciences, Calcutta	0.24
18.	Indian National Science Academy, New Delhi	5.73
19.	Sree Chitra Tirunal Institute of Medical Sciences and Technology, Trivandrum	8.48
20.	Indian Institute of Geomagnetism, Bombay	2.00
21.	Bose Institute, Calcutta	3.35
22.	Indian Institute of Tropical Metereology, Pune	2.38

23.	Raman Research Institute, Bangalore	1.80
24.	Indian Academy of Science, Bangalore	0.16
25.	Maharashtra Association for Cultivation of Science, Pune	1.47
26.	Indian Institute of Astrophysics, Bangalore	4.08
27.	Birbal Sahni Institute of Palaeobotany, Lucknow	1.34
28.	Wadia Institute of Himalayan Geology, Dehradun	1.66
29.	National Institute of Immunology, New Delhi	23.00
30.	Indian Association for the Cultivation of Science, Calcutta	4.27
	Total	59.96

Department of Space

31.	Physical Research Laboratory, Ahmedabad	9.26
32.	National Remote Sensing Agency, Hyderabad	15.10
	Total	24.36

Department of Agricultural Research and Education

33.	Indian Council of Agricultural Research, New Delhi	328.64
	Total	328.64

Department of Health and Family Welfare

34.	Indian Council of Medical Research, New Delhi	44.32
	Total	44.32

Department of Scientific and Industrial Research

35.	Council for Scientific and Industrial Research, New Delhi	244.62
	Total	244.62

Department of Tele-communications

36.	Centre for Development of Telematics (C-DOT)	19.20
	Total	19.20
	Grand Total	811.91

The audited annual accounts of four autonomous bodies viz Sree Chitra Tirunal Institute of Medical Sciences and Technology, Indian Council of Agricultural Research (ICAR), Indian Council of Medical Research (ICMR) and Council of Scientific and Industrial Research (CSIR), alongwith Separate Audit Reports on their accounts for 1991-92, have been sent to them and to the concerned Departments/Ministries of Government of India. The accounts of all the four autonomous bodies were received for audit within the prescribed time limit. Separate Audit Report on the accounts of the Wildlife Institute of India (Ministry of Environment and Forests) for 1991-92 was not issued as the extension for the period of entrustment of audit to the Comptroller and Auditor General of India had not been received from the Government of India. Separate Audit Reports on the accounts of the remaining 31 bodies are not required to be prepared. The accounts for 1991-92 of 16 of these 31 autonomous bodies have not been received for audit, including accounts for some of the years prior to 1991-92. The details are given in Appendix I.

1.2 Outstanding Utilisation Certificates

Certificates of utilisation of grants are required to be obtained by the Ministries and Departments concerned from the grantees, i e statutory bodies, non-government institutions etc , indicating that the grants had been utilised for the purpose for which they were sanctioned and that, where the grants were conditional, the prescribed conditions had been fulfilled. Utilisation Certificates for grants amounting to Rs 1943.48 crores were outstanding to be received in the Departments as per details given in Appendix-II. Some of the certificates are outstanding from 1976-77 onwards. The Chief Accounting Authority in the Departments would need to look into this and obtain the certificates or recover the amounts.

CHAPTER II

Department of Atomic Energy

2.1 Fast Breeder Test Reactor

2.1.1 In the second phase of India's Nuclear Power programme, plutonium derived from operation of the first phase programme of Pressurised Heavy Water Reactors (PHWRs) is planned to be utilised, alongwith depleted Uranium, in Fast Breeder Reactors (FBRs). Apart from producing power more efficiently, these would produce more Plutonium than they consume. Atomic Energy Commission, therefore, decided, in 1971, to set up a Fast Breeder Test Reactor **(FBTR)**, at the Reactor Research Centre, Kalpakkam, now known as Indira Gandhi Centre for Atomic Research **(IGCAR)** since 1985, as an experimental reactor. The main objectives were:

- To demonstrate feasibility of a Sodium cooled fast breeder reactor equipped with steam generator and turbine representative of modern high thermal efficiency units.

- To provide a test bed for development of fuel,blanket(depleted Uranium and Thorium) and structural materials with particular reference to development of high performance fuel.

- To gain experience in reprocessing and re-fabrication of fuel and blanket.

- To develop a nucleus of personnel for design, construction and operation of future fast breeder reactors.

The FBTR project report envisaged construction of Fast Breeder Test Reactor with Thermal output of 42.5 MWt and Electrical output of 15 MWe.

Out of 15 MWe of electricity produced 2 MWe would be utilised by IGCAR (Station and Centre) and the balance 13 MWe would be fed into Tamil Nadu grid. A dump condenser was provided in the original design itself so that the reactor could be operated at full power without generating electricity, with heat rejection to the atmosphere, and irradiation experiments could continue.

2.1.2 Department of Atomic Energy **(DAE)** reached a formal agreement in 1969 with Commissariait AL 'Energic Atomique (CEA), France to provide technical assistance for design of Fast Breeder Test Reactor, similar to the experimental fast breeder reactor of 40 MW 'Rapsodie' of France except for addition of steam generator and turbine in FBTR. DAE subsequently entered into consultancy agreements during 1972 and 1973, with CEA-France for technical system consultancy and with four other French Industries for supply of manufacturing know-how. A major portion of equipment and components were planned to be manufactured in India.

2.1.3 The estimated cost of Rs 34.85 crores (excluding the cost of fuel), with foreign exchange component of Rs 8.24 crores, was sanctioned by DAE in September 1971. The cost of procurement of fuel of Rs 10.40 crores, with foreign exchange component of Rs 6.42 crores, was sanctioned by the Government in August 1973. In June 1978, the project cost was revised to Rs 58.72 crores with foreign exchange component of Rs 16.26 crores. In April 1983, the cost was further revised to Rs 68.72 crores, with foreign exchange component of Rs 16.26 crores. The revised costs approved by the Government in June 1978 and April 1983 were exclusive of cost of fuel of Rs 10.40 crores which had been approved by the Government in August 1973. The total approved cost of FBTR was Rs 79.12 crores (April 1983) with foreign exchange component of Rs 22.68 crores. The cost of fuel was estimated to be Rs 17.11 crores. Thus, the estimated cost of FBTR was revised upward by 52.75 **per cent** within a period of seven years and further raised by 14.47 **per cent** in the next five years. No revised estimates of cost and time frame for the project were made after April 1983, though the expenditure far exceeded the approved cost.

IGCAR had spent Rs 76.93 crores upto 1988-89 under capital and Rs 15.05 crores under revenue upto 1991-92. Total expenditure on this project under both capital and revenue thus works out to Rs 91.98 crores excluding the cost of fuel which was not made known to Audit. Booking expenditure both under capital and revenue heads while the project has not yet been opened for service (i.e. not yet fully commissioned) is in contravention of the Rule 292 of the General Financial Rules (GFR) and results in understating the cost of the project. In course of discussions, IGCAR stated that no provision for

commissioning expenses had been made in the project estimates and, therefore, expenditure relating to commissioning and operation has been provided in the revenue budget. IGCAR further stated in February 1993 that this was an R&D and not a commercial project and, therefore, commissioning expenditure was brought under revenue head of account. This view of IGCAR is not tenable as the Rule ibid does not differentiate a capital project as commercial and R&D project.

The increased cost of the project was attributable to escalation of prices (37.57 **per cent**), increase in customs duty (21.04 **per cent**), increase in exchange rates (10.98 **per cent**), increase due to design modifications (5.02 **per cent**), delays in construction activities (20.27 **per cent**), manufacture of components, supply, installation and in commissioning of machinery/equipment etc (5.12 **per cent**).

2.1.4 In July 1973, it was anticipated that FBTR would be commissioned by 1976. This was subsequently revised to 1981, 1982, 1983 and 1984. However, the reactor could attain its first criticality with 22 fuel sub-assemblies only in October 1985. The delays were attributed to change in the Public Sector Undertaking for manufacture of reactor components (69 months), delay in completion of Civil work (12 months), piping work (60 months), electrical works (23 months), air-conditioning (48 months), supply, installation and commissioning of machinery and equipment (24-84 months).

During November 1985 to June 1986 low power physics experiments were carried out. The reactor was shut down during May 1987 to April 1989 due to fuel handling incident in May 1987 and during July 1989 to May 1990 to carry out biennial Reactor Containment Building (RCB) leak test, commissioning of side steam filtration and Chemical cleaning of service water systems etc. It was stated by IGCAR in February 1993 that during 1992 the reactor has been operated for more than 4400 hours and cumulative operating time since first criticality has been over 6800 hours (December 1992). It was further stated that reactor power was raised to 4 M Wt on 21st January 1993 by valving in of steam generators and all the systems worked satisfactorily during this operation. Even with this raising of reactor power, it has remained at 9.41 **per cent** of the targetted power (42.5 M Wt).

The turbo generation system (Rs 186 lakhs) procured in June 1983 and installed in March 1984 has not been commissioned yet as the first Core (of 22 fuel sub assemblies) is limited in size to a thermal output of around 10 MWt. It was thus not possible to produce electricity, as it was considered inadvisable to run the turbo-generation at very low load. Full output of 42.5 MWt of FBTR would be reached only when the present core is replaced by a large core with 65 fuel sub-assemblies. Till then it is planned to operate the reactor upto 10 MWt.

The delays in construction, commissioning and operation of FBTR, to the full output of 42.5 MWt were attributable to the following :

- Design changes were carried out based on the experience of CEA-France.

- The core design was modified to make use of the indigenous fuel. It was initially planned to use mixed oxides of Plutonium and Uranium. it was decided to use mixed Carbides of Plutonium and natural Uranium instead of enriched Uranium.

- In the trial stage of 1984-85, due to leak of Nak(Sodium/Potoassium), modifications were to be incorporated in the primary and secondary system cold traps as recommended by safety review committee.

- In 1987, due to leakage of Nitrogen in flanges/valves of the preheating, Nitrogen circuit required rectification.

- In May 1987, a complex mechanical interaction occurred owing to fuel handling error in the reactor in vessel, causing damage to certain 'in-vessel' components. The rectification took about two years. This was a set back to the project.

- Implementation of modifications in safety logic circuits of Control Rod Drive Mechanisms (CRDM) for SCRAM/LOR as recommended by safety committee due to inherent problem faced at that stage.

- In September 1988, problems of failure of the cores of the trailing cables were noticed during the process of retrieval of damaged sub-assemblies in the reactor.

- In February 1989, the load cell failed and the Capsule Transfer Gripper (CTG) got damaged. This was rectified in April 1989.

- In July 1989, the reactor was shut down as the desired availability factor could not be achieved due to noise pick-up by the reactor protection logic and unsatisfactory operation of speed control system for primary Sodium pumps.

- In November 1989, due to certain construction deficiencies, interference of the hangers with the complimentary shielding was observed in the primary Sodium system .

2.1.5 Accepting (December 1991) the time overrun and the cost over run, IGCAR stated that the delay in commissioning of the project was due to delay in receipt of equipment at site, delay in signing the technology transfer agreements, difficulties in achieving the required quality in manufacture and relatively low priority received by FBTR jobs in work of various suppliers due to their lower contribution to the turn over of the company. IGCAR also stated (November 1991) that the delay in commissioning of the project was also due to (i) under-estimating the magnitude of task due to lack of earlier familiarity with the technology of fast breeder reactor, (ii) their decision to indigenise to the maximum extent resulting in delays in the supply of equipment and (iii) inexperience of the staff. Regarding the fuel handling incident of May 1987, IGCAR stated that it should have been avoided and it happened due to deficiencies. IGCAR also attributed (May 1992) non-achievement of power level beyond 10 MWt to complexity of technology, certain omission and commission made by the staff in design construction and commissioning activities and equipment failures like main boiler feed pumps.

DAE stated, in November 1992, that the original estimates were based on inadequate knowledge of the complexities of fast breeder technology and that where work is of developmental nature there is bound to be some unforeseen expenditure. It was further stated that all the technical problems had been solved without any derating of the reactor and that has resulted in developing expertise in solving problems and has become a valuable

base for improving the design of the Prototype Fast Breeder Reactor (PFBR). The Department would make every effort to avoid, in the execution of the (future) PFBR projects, all that was avoidable. FBTR had provided the necessary base for developing the technology, materials and equipment and the men needed for the Fast Breeder Programme.

It was also indicated that India is the only developing country and seventh in the world to build and operate a FBTR. It is a complex high technology and FBTR uses indigenously developed fuel, indigenously procured and purified sodium and indigenously manufactured reactor components.

2.1.6 In sum,

- FBTR which was initially planned to be commissioned by 1976 attained its first criticality in October 1985 with 22 fuel sub-assemblies which can give power upto 10 MWt. The reactor is yet to be loaded with 65 fuel sub-assemblies to attain power at 42.5 MWt, as originally envisaged, even after 16 years. (It was mentioned during discussion that the reactor in its present condition was capable of being loaded with 65 fuel sub assemblies with which full power content of 42.5 MWt can be achieved.)

- The project was to be completed at estimated cost of Rs 34.85 crores by 1976. However, expenditure has gone up to Rs 91.98 crores upto March 1992. Thus, there was cost over run of Rs 57.13 crores i.e. 164 **per cent** and time over run of 16 years i.e. 220 **per cent**.

- Estimates of cost and time frame of the project were not revised after April 1983. Costs beyond the approved estimates were incurred merely on the basis of the approval to the budget estimates.

- The likely date of completion and the final cost of the project are still indefinite.

2.1.7 Delay in commissioning of FBTR would in turn delay the 500 MWe Prototype Fast Breeder Reactor (PFBR)

programme of DAE on which an expenditure of Rs 34.28 crores has already been incurred (during 1985-92).

2.2 Primary Coolant Pumps

Primary Coolant Pumps (pumps) which are used to circulate heavy water through the core of the Nuclear Reactor are critical items of equipment in the Pressurised Heavy Water Reactors in Nuclear Power Projects.

For Rajasthan Atomic Power Project (RAPP) and Madras Atomic Power Project (MAPP), these pumps were imported. With a view to indigenising manufacture of the pumps, the Department of Atomic Energy (DAE) (management of power projects was passed on to Nuclear Power Corporation of India Limited (NPCIL), a Government of India Undertaking, with effect from September 1987) identified a German firm (Firm) for transfer of technology and entered into a tripartite agreement (agreement) in August 1976 with the Firm and their Indian subsidiary (supplier). As per the agreement, DAE paid Rs 64.29 lakhs to the Firm as engineering fees towards know-how charges for transfer of technology. The agreement (amended in February 1988) provided for manufacture of 40 pumps (including motors) intended for Narora Atomic Power Project-2 (NAPP-2), Kakrapar Atomic Power project (KAPP), Kaiga Atomic Power Project (KAIGA) and Rajasthan Atomic Power Projects 3 and 4 (RAPPs 3 & 4) at an estimated cost of Rs 2634 lakhs. Imported materials procured for manufacture of the pumps were to be issued by DAE to the supplier free of cost. DAE, after settling the terms and conditions, was required to place orders so as to enable the supplier to manufacture and deliver upto four pumps every year commencing from 1979 onwards. The agreement stipulated a price structure for the pumps which provided a profit margin of 14.69 **per cent** of selling price to supplier.

The agreement also provided that in case DAE took a quantity lesser than four pumps in a year, the profit margin of the supplier would be so enhanced as to keep their total profit at the same level. Subsequently in 1982, DAE reduced the off take of the pumps, over ten years period, to 28 from 40, due to delay in issuing financial sanction for projects. Consequently the profit margin of the supplier was increased to 15.82 **per cent** for KAPP, 17.27 **per cent** for KAIGA and 17.51 **per cent** for RAPPs 3 and 4.

The supplier completed supply of four pumps for NAPP II in 1982 and the balance 24 pumps between 1985 and 1990 at a total cost of Rs 4378.50 lakhs.

A scrutiny in audit of the payments made for supply of pumps under the agreement disclosed that concessions and undue benefits were allowed to the supplier, to the extent of over Rs 835 lakhs as detailed below:

(i) The imported components were procured by DAE after paying the cost including customs duty and issued to the supplier as free issue material. However, the value of these materials including the customs duty paid was also included in computing the profit margin. This resulted in extra expenditure of Rs 401.47 lakhs on three projects (KAPP, KAIGA, RAPPs 3 & 4). DAE stated (March 1991) that the imported materials supplied as free issue material to the supplier were also required to be further machined/processed by them for manufacture of pumps. This is not tenable as even in that case the profit computation should have been based on value addition only instead of the entire cost of the material issued as free issue material. DAE further stated in March 1993 that the profit margin to the supplier was required to be worked out on selling price as per the agreement and not on the conversion cost. As such custom duty on free issue materials was included. This also is not tenable as the entire cost of material was included in the price structure for the purpose of working out the profit in the original agreement when the imported materials were to be arranged by the supplier but, subsequently under the changed arrangement DAE would obtain the imported materials and pass on to the supplier as free issue material.

(ii) On the materials imported for KAIGA and RAPPs 3 & 4, customs duty was paid @ 39 and 34 **per cent** of CIF value respectively. However, for calculating the profit margin notional customs duty @ 45 **per cent** was taken into account. This resulted in undue benefit of Rs 13.23 lakhs to the supplier. DAE's contention (March 1993) that the average rate of customs duty paid for all the three projects works out to 47 **per cent** is not tenable as it amounts to covering up the excess payment of customs duty made for KAIGA and RAPPs 3 & 4.

(iii) The selling price was arrived at after including warranty charges @ 1.49 **per cent** each for KAPP and RAPPs 3 & 4 and @ 1.48 **per cent** for KAIGA project which worked out

to Rs 20 lakhs for each project. Inclusion of warranty charges as element in the selling price for working out the profit margin was not justified. It amounted to unintended benefit to the extent of Rs 2.93 lakhs (@ 14.69 **per cent**) for each project.

(iv) Pending finalisation of prices of the eight pumps supplied between October 1988 and September 1989 for KAIGA project, advance payments were made based on a provisional price fixed for the pumps. The final price fixed in January 1989 was however less than the provisional price, mainly due to the fact that on the latter the cost of indigenous free issue material was included. This resulted in excess payment of Rs 235 lakhs to the supplier. Though the excess payment was finally adjusted from the final payments made in March 1989, the resultant loss of interest worked out to Rs 48.39 lakhs.

(v) The selling price of the pumps included handling charges for motors of the pumps at 6.13 **per cent** of the cost of the motor ie at Rs 3.20 lakhs per motor. As the motors were supplied by a State Public Sector Undertaking direct to the site, there was no justification for giving handling charges separately. The payment of Rs 89.60 lakhs in this respect was avoidable. DAE stated in March 1983 that the handling charges were paid as per the agreement but DAE was silent as to the justification of such a provision in the agreement.

(vi) The supplier had assumed recovery of the full cost of Plant and Machinery and other assets by the end of 1988 when the original agreement was due for expiry. When the period of agreement was extended by two years and the supplier had actually completed delivery of pumps in August 1990, the depreciation on plant and machinery with life span extended by two years should have worked out to a lesser percentage. The depreciation overcharged for the twelve pumps supplied after January 1989 worked out to Rs 95.10 lakhs. DAE's reply (March 1993) that the total depreciation charge to 28 pumps was in respect of all investments except land and building plus pro-rata depreciation for land and buildings is not tenable as charge of depreciation beyond the period of ten years allocable to cost of eight pumps was not as per the agreement.

Besides, DAE under the terms of agreement, had to make to the Supplier additional payments of Rs 87.90 lakhs due to the raising of the profit margin of the supplier from 14.69 **per cent** to 17.51 **per cent** consequent on the reduction of off take of pumps and Rs 35.00 lakhs for the failure to place orders for the stipulated minimum of four pumps in 1980 and 1981. DAE stated (March 1991) that the revision of profit margin was considered in order to retain the economic viability of the supplier to manufacture these pumps and payment of Rs 35 lakhs made towards reimbursement of fixed expenses was strictly in terms of the main agreement. However no liquidated damages, under the agreement, was realised from the supplier for the delay of over four years (February 1981 to July 1985) in supply of the pumps. DAE stated in March 1993 that the delay cannot be attributed to the supplier as facilities were not available in Bhabha Atomic Research Centre. However, levying of five **per cent** liquidated damages to the supplier for delayed supply of motors was under consideration.

Four primary coolant pumps manufactured for KAIGA were transported from the supplier at Pune to Bombay between October 1988 and January 1989 to be stored at Trombay village. Concessional rate of sales tax at 4 **per cent** by submission of form 'C' was not availed of as Trombay village was not the ultimate consignee. A decision was taken in August 1988 that all the pump components should be despatched to the respective project site so as to avail of CST @4 **per cent.** These pumps were redespatched to RAPP in 1988 as there were no storage facilities at KAIGA. Thus an avoidable expenditure of Rs 42.50 lakhs on sales tax and octroi had to be incurred by unnecessarily transporting the material from Pune to Bombay. There was no rationale behind transporting the pumps meant for Kaiga to Bombay and from Bombay to RAPPs. DAE stated in March 1993 that the pumps were sent to Bombay for testing at the Bhabha Atomic Research Centre which was subsequently not done to avail of the concessional rate of sales tax. According to DAE, the pumps meant for KAIGA were sent to site of RAPPs for want of storage facilities at KAIGA.

It was envisaged in 1981 that out of 79 imported components valued at Rs 164.35 lakhs for NAPP-2, 38 items valued at Rs 106.02 lakhs for KAPP onwards would be indigenised. Notwithstanding the concessions and undue advantages allowed to the supplier, only 19 items out of 37 (excluding one item which was not procured) were

indigenised. The percentage of indigenisation achieved works out to 30 per cent as against the envisaged 65 per cent. While accepting the facts DAE stated in March 1993 that out of remaining 18 items to be indigenised, 11 items are partially indigenised, balance 7 items represent components which would involve time and efforts for indigenisation.

2.3 Directorate of Purchase and Stores - audit review

2.3.1 Introduction

Department of Atomic Energy (DAE) is exempted, since March 1956, from making its purchases through the Directorate General of Supplies and Disposals (DGS&D) in view of highly specialised nature of the stores required. Initially, the items procured were for the R&D work in the field of nuclear energy. With the gradual expansion and diversification of research and developmental activities and desirability of channeling import to comply with the custom regulations and of availing of concessional rate of custom duty at the project stage, a separate centralised purchase and stores organisation was constituted under DAE in June 1972 known as the Directorate of Purchase and Stores (DPS). The unit is headed by the Director who is assisted by officers at various levels for purchase, stores, administration and accounts. DPS is composed of Central Purchase Unit and regional units situated at Madras, Hyderabad, Kota, Calcutta, Delhi and Indore besides its stores units.

The central purchase unit based at Bombay is the main-stay of the organisation which handles purchases not only on behalf of all the projects/units located in and around Bombay but also for other projects/units when value of items exceeds the purchasing powers delegated to the respective regional purchase units. The regional purchase units are not authorised to procure imported items. For domestic procurement their delegated powers range from Rs 0.15 lakh to Rs 1.00 lakh.

The staff position of Bombay based DPS unit as well as regional units as on 31st March 1992 and expenditure incurred on staff salaries/office expenses, machinery and equipment and materials and supplies during 1986 to 1992 were as under :

	Bombay based DPS unit
Men-in-position (in numbers)	706
Salaries/office expenses **(in lakhs of rupees)**	1906.04
Machinery & equipment **(in lakhs of rupees)**	43662.16
Materials & supplies **(in lakhs of rupees)**	45772.40

2.3.2 Scope of audit

Transactions of Bombay based unit of DPS and its stores units at Bhabha Atomic Research Centre (BARC), Bombay and Tarapur for the period 1986-92 were examined in audit and the major findings are set out in the succeeding paragraphs.

2.3.3 Highlights

Over 2000 files on purchases worth Rs 248 crores, requisitioned by Audit, were not made available. Audit scrutiny of the records made available revealed deficiencies in systems and methods leading to irregular/avoidable expenditure of Rs 9.25 crores main details of which are indicated below:

- **The purchase procedure did not prescribe any time limit, from the date of receipt of indent, for inviting and finalisation of tenders. In case of major purchases (Rs 25 lakhs/Rs 50 lakhs and above) time schedules were framed from May 1990. As against the maximum period of 20 days (indigenous items) and 25 days (imported items) allowed between the date of receipt of the indent and the date of issue of tender enquiry, there were delays ranging between 21 days and above six months in 77 out of 90 cases. There were delays of 21 days to one year and above in opening of tenders, from the date of receipt of indent, in 88 out of 90 cases and in placement of formal contract (from the date of opening of tenders) in 89 out of 90 cases. (Para 2.3.4)**

- Purchase orders were issued after expiry of validity of offers in 87 out of 90 cases. There were delays ranging from four months to over one year in 44 out of 90 cases. Delayed placement of purchase orders involved extra expenditure of Rs 350.25 lakhs. In 87 out of 90 cases, there had been delays in procurement of material/equipment etc, upto six months in three cases, upto six months to two years in 35 cases, two years to three years in 32 cases, three years to four years in nine cases, four years to six years in seven cases and above six years in one case. (Para 2.3.5)

- Non acceptance of lowest offer for no justifiable reasons involved extra expenditure of Rs 8.72 lakhs. (Para 2.3.6)

- Customs duty to the extent of Rs 446.69 lakhs in respect of 307 cases had to be paid due to non-completion of custom formalities in time and grant of refund claim was awaited. (Para 2.3.7)

- Items worth Rs 35.89 lakhs were lying in stores for long periods. There was excess procurement of consumable items worth Rs 44.56 lakhs in various divisions of BARC Stores. Stock of 14,407 grammes of pure gold is lying in Central stores. Out of this, 9286 grammes were lying since 1965. Twelve divisions have kept inflammable items for more than 10 years. Some inflammable items were declared as surplus but these were still lying in stores. (Para 2.3.8)

- Advance payments worth Rs 43.54 lakhs were made to suppliers but the items were not acceptable due to defects etc. Position of outstanding advances against suppliers was not monitored properly and a sum of Rs 1629.98 lakhs pertaining to the period 1977-87 was outstanding. (Para 2.3.9)

- The stock cards and registers of capital equipment and furniture and fixture were not maintained by High Level Waste Management Stores. A number of items were issued as free issue materials from 1987 onwards in Fuel Reprocessing Divisional Stores but return of balance material was not watched, showing lack of control on materials

issued. As per General Financial Rules, value account was required to be maintained. However, Stores units maintained quantitative accounts only and no priced inventory was maintained. (Para 2.3.10)

Physical verification was not conducted in respect of Desalination Stores (DEED) and Air-conditioning and Mechanical Plant Stores. As many as 7181 discrepancies in four stores remained unsettled. (Para 2.3.11)

2.3.4 Processing and coverage of indents

Yearwise position of receipt of indents and placement of purchase orders by Bombay based DPS Unit during the last six years was as under :

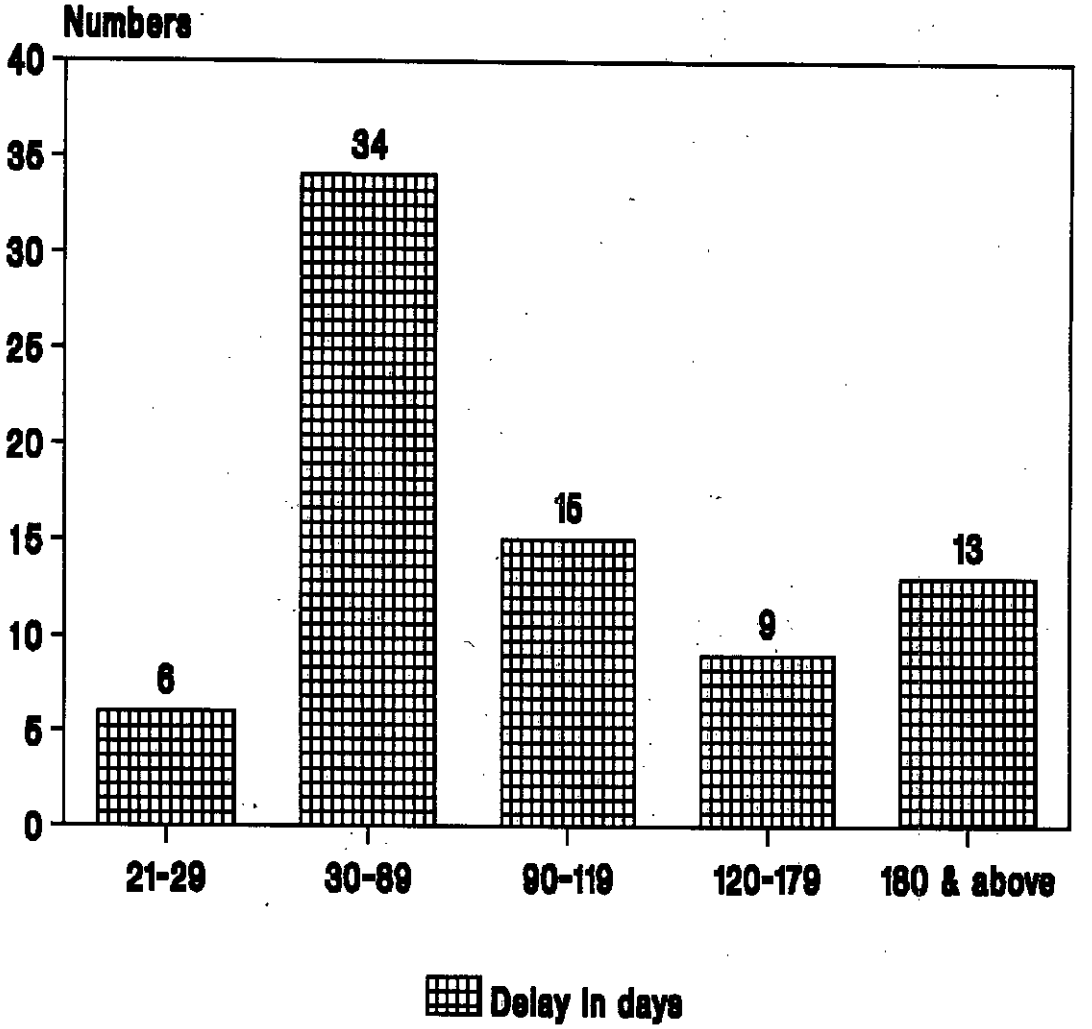
	Indents received	Purchase orders placed
1986-87	16,523	13,727
1987-88	15,738	14,404
1988-89	16,923	14,077
1989-90	15,755	12,778
1990-91	12,734	11,974
1991-92	13,831	9,934
Total	91,504	76,894

Thus, there were 14,610 indents pending for action as on 31st March 1992.

According to the prescribed purchase procedure purchases of Rs 25 lakhs and above (indent estimation) were treated as major purchases till May 1990 when the limit was raised to Rs 50 lakhs. As per time schedule for major purchases, open tenders were to be floated within 20 days (indigenous item) and 25 days (imported item) and limited tender within 15 days of receipt of indent.

No time limit has been prescribed in the procedure for inviting and finalisation of tenders for purchases not falling under the category of 'major purchases'.

INDENTS


Numbers
40
35
30
25
20
15
10
5
0
34
15
13
9
6
21-29
30-69
90-119
120-179
180 & above
Delay in days

There were delays in issue of tender enquiries (from the date of receipt of indents), in 77 out of 90 cases seen in audit, from the date of receipt of indents as under:

Delay (in days)	Number of cases
21 to 29	6
30 to 89	34
90 to 119	15
120 to 179	9
180 and above	13
Total	77

On receipt of an indent in DPS, the mode of purchase, viz through open tender, limited tender or single tender, is decided and tenders are invited accordingly. There is no time span prescribed under the procedures for placement of orders from the date of invitation of tenders .

However, the time taken for opening of tender from the date of receipt of indent and the time taken for placement of formal orders from the date of tender in respect of 90 cases reviewed in audit was as under :

Delays of	Number of cases	
	For opening of tender from date of receipt of indent.	For placement of formal contract from the date of opening of tender
Three weeks to two months	9	1
Two to three months	8	6
Three to four months	15	9
Four to six months	21	18
Six months to one year	29	39
Over a year	6	16
Total	88	89

The delays were generally attributable to :

- negotiations with the firm for removal of unacceptable terms, lowering of prices etc,

- correspondence with the indentor for the technical evaluation of the offers etc,

- calling of the clearance report from the Directorate General of Technical Development (DGTD), release of foreign exchange etc. and

- correspondence with the firms for confirming the rates after validity of supplier's offer etc.

Even where some of these factors became unavoidable, the time taken at each stage was long indicating lack of urgency in handling these cases.

2.3.5 Delay in procurement

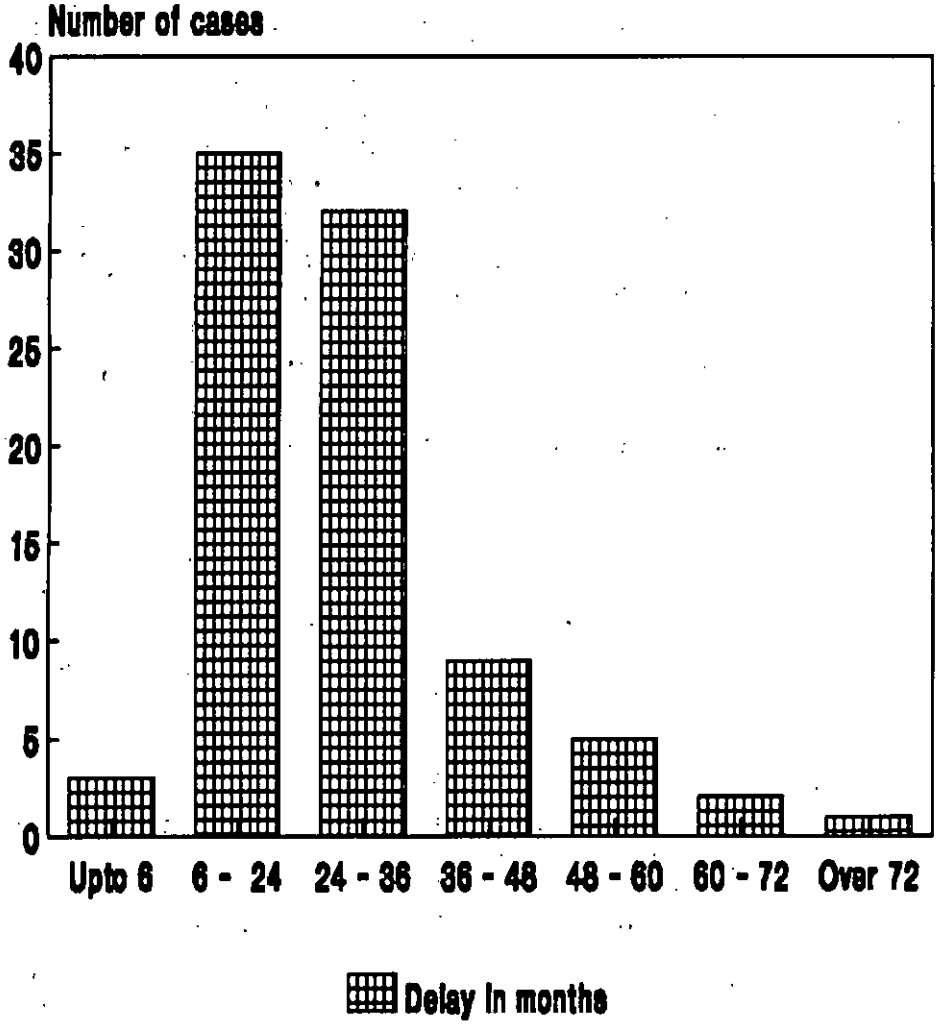
Dates of delivery prescribed in the purchase orders were not adhered to by the suppliers in 44 out of 90 cases. The delays were upto four months in six cases, four to six months in six cases, six months to one year in 22 cases and over one year in 10 cases.

In 87 out of 90 cases seen , there had been delays, in procurement of material/equipment etc with reference to the delivery schedule indicated in the indent, ranging from five months to six years and above as under :

Delay (in months)	Number of cases
Upto 6	3
6 to 24	35
24 to 36	32
36 to 48	9
48 to 60	5
60 to 72	2
over 72	1
Total	87

Purchase orders were seen to have been placed after expiry of validity of offer presuming that the firms would keep the offer valid. Review of 90 cases revealed that due to not placing purchase orders within the validity offered by the supplier or by reinviting tenders, DPS had to incur extra expenditure of Rs 350.25 lakhs. A few illustrations are given below :

Delay in procurement



(i) Nuclear Fuel Complex (NFC) submitted an indent to DPS in August 1987 for supply of 516 tonnes of hot extruded/cold finished, annealed and pickled stainless steel mother pipes. The pipes were required as raw material for manufacture and supply of finished pipes to two units. In response to open tenders issued in November 1987, 13 offers were received and the offer (12th January 1988) of an Indian firm 'A' on behalf of their principal in Sweden was found to be the lowest acceptable with validity of offer upto 12th February 1988 (extended upto April 1988). DPS had taken up the issue for import clearance with DGTD, in February 1988, after delay of six months from the receipt of indent, and the same had not been received till March 1988. Retendering was resorted to in November 1988. The offer of firm 'A' was again found the lowest acceptable and purchase order was placed on them on 21st November 1988 at a total cost of Rs 670.99 lakhs , an increased price, as compared to the firm's earlier offer of January 1988.

Thus, due to non-placement of purchase order on the lowest offer within the validity of offer, DPS had to incur extra expenditure of Rs 221.89 lakhs. For DGTD's clearance, the matter could have been taken up soon after receipt of the indent.

ii) In September 1987, NFC placed an urgent indent for purchase of " Inconel Alloy 600 plates" on single tender basis from a Government of India enterprise which was the sole supplier in the country. The firm's offer of 1st December 1987 for Rs 420 per Kg which was valid upto 30th December 1987 was not accepted. The firm quoted subsequently, in March 1988, Rs 520 per kg and this offer was valid upto 10th April 1988. The firm clearly indicated the likelihood of further increase in prices because of increases in price of nickel by April 1988 and requested DPS to issue telex of intent before 10th April 1988 upto which it was prepared to absorb and hold the price to Rs 520 per kg. DPS placed order only in June 1988 when the cost was Rs 740 per kg. The packing and forwarding charges had also gone up from Rs 1.10 per kg to Rs 1.70 per kg.

DPS stated (January 1991) that the supplier's offer was not considered earlier because competitive foreign offers were being sought to help in negotiation with the firm to get them to lower the price. It was also stated that the concerned files which were referred back to the

indentor in December 1987 were received back only in May 1988. There was, however, nothing on record to indicate that foreign offers were invited or were under consideration. The inordinate delay in placement of purchase order on the firm involved an avoidable extra expenditure of Rs 41.36 lakhs.

(iii) Based on indent dated 18th November 1987 from NFC, a limited tender enquiry was issued in January 1988 for purchase of 27 tonnes of stainless steel type 316 round bars. The offer of Bombay based firm at the rate of Rs 47,850 per tonne for 140, 150 and 160 mm dia SS bars and Rs 47,350 per tonne for 90 mm dia SS bars inclusive of excise duty at the rate of Rs 365 per tonne was found acceptable. The offer was valid upto 22nd March 1988. DPS did not place the purchase order within the validity period and requested the firm on 21st April 1988 to extend the validity period till June 1988. The firm agreed to extend the validity but with an increased price of Rs 63,000 per tonne and Rs 59,600 per tonne respectively for these items.

As this price increase was not acceptable, fresh limited tenders from four firms were invited in June 1988. Out of the two offers received, the lower offer of the same firm at Rs 63,250 per tonne and Rs 62,500 per tonne for 240, 150 and 160 mm dia and 90 mm dia SS bars respectively valid till 28th July 1988 was accepted. But, DPS again failed to place the purchase order within the validity period. The purchase order was placed in March 1989. The firm declined to supply the material at the quoted rate and intimated that the price of the material would be Rs 1,05,250 per tonne for 140, 150 and 160 mm dia and Rs 1,04,700 per tonne for 90 mm dia Steel bars.

With the revision, the second offer of a Public Sector Undertaking (PSU) who agreed to keep its offer valid till mid July 1989 became cheaper. Accordingly, a purchase order at Rs 67,205 per tonne plus Nickel surcharge Rs 22,320 per tonne plus excise duty at Rs 580 per tonne for all the items for 32 tonnes was placed in July 1989. In August 1989, the PSU informed DPS that they had confirmed the validity of their offer till mid July 1989 by mistake and quoted their revised price as Rs 74,850 per tonne plus Rs 25,680 per tonne as Nickel surcharge plus Rs 1575 per tonne excise duty. This was agreed to as this revised price still remained cheaper than the revised price quoted by the Bombay based firm.

PSU had supplied 25.126 tonnes of steel bars upto March 1991 at a total cost of Rs 30.01 lakhs (inclusive of duties and taxes). Though the material was indented as early as in November 1987 and was required at the earliest, DPS could procure only 78.52 **per cent** of the material in August 1991. The price of the material finally purchased was 240 **per cent** of the price initially found acceptable and the delay in finalisation of tender resulted in an extra expenditure of Rs 17.53 lakhs. The details of supply of balance of 6.87 M.T. of material and expenditure incurred thereon though asked for were not furnished to Audit.

(iv) Drilling Section of the Atomic Minerals Division raised an indent in April 1986 for immediate requirement of drill rods for which public tender was floated on 3rd June 1986 with due date of opening as 8th September 1986. Offers received were sent to indenting officer, for recommendation, on 25th September 1986. The concerned file was received back in DPS on 4th December 1986. After discussion with indenting officer, DPS placed the purchase order on a Bombay based firm on 30th January 1987. This was received by the firm on 10th February 1987 after expiry of the validity period on 30th January 1987. As a result, the firm did not accept the order at their earlier offer of Rs 39.50 lakhs. The items were retendered in May 1987 and a purchase order was placed with another firm on 15th October 1987 for Rs 49.34 lakhs. Indenting officer had earlier (23rd January 1987) rejected the offer of this firm on the ground that they were yet to supply drilling rods as per another purchase order. The firm had also claimed additional amount of Rs 4.06 lakhs towards variation in foreign exchange rates and custom duty.

Non-placement of purchase order within the validity period of the offer resulted in extra expenditure of Rs 13.90 lakhs DPS stated in June 1992 that work load of too many orders to be finalised within a short spell of time resulted in the delay.

(v) A purchase order was placed on a PSU in April 1988 for supply of 25.26 tonnes of stainless steel plates in various sizes at Rs 62,550 per tonne. As per terms and conditions laid down by the firm, the prices payable would be those prevailing on the dates of delivery. After issue of the purchase order, the firm intimated in April 1988 that the price of steel plate had increased by Rs 7000 per tonne due to increase in the price of nickel and requested for confirmation of acceptance of the increased price to be sent

to their Bombay office which was processing the purchase order. An amendment to the purchase order was issued by DPS in September 1988 to the Calcutta office of the firm. A copy of the amendment to the purchase order was sent to the Bombay office in January 1989. Due to this delay, no action was taken by the firm for production of the material. In October 1988 and March 1989, the firm informed DPS of the increase in the prices of stainless steel plates to Rs 79,050 per tonne for 6 mm size and Rs 78,050 per tonne for 10 and 12 mm sizes. Nickel surcharge of Rs 21,360 per tonne plus excise duty at Rs 1050 per tonne were also payable. Accordingly, DPS issued an amendment (May 1989) confirming the price increase to the firm's Bombay office. Supplies were made in February 1990. Thus, due to delay in issuing the amendment to the purchase order and intimating it to the supplier's Bombay office, an extra expenditure of Rs 8.09 lakhs was incurred. DPS stated (January 1991) that the matter would be taken with the firm for arranging a refund of Rs 8.09 lakhs. However, no refund has been received (January 1993).

(vi) Indent for supply of air-gauge, alongwith masters, to measure inside diameters of tubes was received by DPS in June 1988. Public tenders were floated in October 1988 with due date of opening of tender as 5th January 1989. The offer dated 9th November 1988 for £ 42,880 was received from the foreign firm with a validity offer upto 30th April 1989. DPS could not place purchase order within the validity. The supplier intimated (August 1989) DPS that as per the offer of November 1988, validity expired on 30th April 1989 and the equipment would be supplied with an increase of nine **per cent** in the cost on their quoted price and that equipment would be supplied in the second quarter of 1990. The supplier also offered to waive some of the increase in cost provided an order was placed prior to 30th September 1989. The purchase order was, however, issued on the firm in December 1989 at £ 46739.20 instead of the concessional offer of £ 42880 involving extra expenditure of Rs 1.31 lakhs.

2.3.6 Non-acceptance of lowest offer

An indenting officer in his evaluation report of June 1986 recommended placement of order for supply of EOT cranes on a firm 'A' while accepting the technically suitable lowest offer for Rs 20.04 lakhs. However, under the impression that due to declaration of lock-out with effect from 1st July 1986 by its management the firm would not be able to

execute the order, the purchase order was placed on another firm 'B' for Rs 28.76 lakhs in August 1987. Firm 'A' had informed (September 1986) DPS that their order would be executed by Crane Division (of the firm) without any delay. In the circumstances, the action taken to place the order with firm 'B' was not in order. Firm 'A' had also stated that as there was a positive indication from DPS, they had already prepared design and identified sources for executing the order. In the case of firm 'B' with whom the above order was placed, the delivery period was extended to 15th April 1988. Thus, the purpose of early delivery of items was not achieved by placing the order on a firm at higher cost resulting in extra expenditure of Rs 8.72 lakhs even though the lowest tenderer was in a position to execute the order.

DPS stated in October 1991 that the lock-out of firm 'A' could affect their efforts as well as the delivery schedule and also stated that besides the technical capacity of the supplier, they had to ensure the commercial viability as well as other infrastructural facilities available with the firm for execution of the order to the required design and specifications of the Department. The reply is not tenable as the capacity of the firm and the effect of lock-out had been made amply clear to DPS by the firm well before placement of order on the other firm.

2.3.7 Excess payment of customs duty

Scientific/technical equipment imported for research activities is exempted from payment of custom duty if the required certificate of 'Not Manufactured in India' (NMI) is obtained from DGTD before actual receipt of the equipment. If NMI certificate is not procured in time, goods are cleared paying custom duty and refund is obtained after producing the NMI certificate. It was observed that refund claims in respect of 307 cases relating to the period 1985-92, involving Rs 446.69 lakhs were pending with the custom authorities (March 1992).

Some cases (out of the 307) involving excess payment of customs duty of Rs 119.66 lakhs due to not obtaining NMI certificate etc in time are shown below :

Sl. No.	Name of the equipment/ material	Value	Date of clearance from custom	Whether custom duty applicable	Custom duty paid	Amount of duty paid in excess	Remarks
					(Rs in lakhs)		
1	2	3	4	5	6	7	8
1.	Stainless steel plates	40.22	Supply effected from September 1982 and completed in August 1983.	Yes, @ 60 percent	@ 220 per cent	6.13	No attempts were made to obtain concessional rate of duty of 60 per cent.
2.	Additional hardware for computer.	16.61	April 1985	No	10.06	10.06 2.11	Duty was protested. Refund was not yet obtained. Further duty of Rs 2.11 lakhs was paid for replacement items. Total refund to be obtained amounted to Rs 12.17 lakhs.
3.	SNM Doorway Monitor and spares.	8.97	September 1985	No	11.96	11.96	NMI/CDE certificates could not be obtained in time.
4.	Combined Nitrogen Oxygen	16.32	Shipment started with effect from January 1987. Last shipment was in August 1987.	Yes, for Rs 2.75 lakhs	4.21	1.46	Some articles were missing at the time of installation. The same were sent free of cost. Although custom duty was paid earlier for full value, custom duty of Rs 1.46 lakhs was again paid for the items sent free of cost. No refund claim was lodged for this excess amount.
5.	Plasma tube and Photo-detector	1.46	September 1988	No	1.24	1.24	NMI/CDE certificates were not obtained before arrival of the consignment.
6.	Helium gas cylinders	12.24	October 1988	No	6.50	6.50	The firm supplied 349 cylinders extra in addition to the ordered quantity. No efforts were made to get NMI certificate for the excess supply.

7.	Pipes wrench	5.03	August 1988	No	2.52	2.52	Application for NMI certificate was turned down by DGTD with a request to DPS to contact indigenous manufacturer as listed in the Hand Book of Indigenous Manufacturer of Engineering/Chemical Stores. As this was not done, customs duty had to be paid.
8.	Stainless steel plates	24.96	March 1990	No	58.89	58.89	NMI/CDE certificates could not be obtained in time because no follow up action with Iron & Steel Controller was taken for issue of amendment to the specification.
9.	Special Austemite stainless steel plates	4.42	June 1990	No	10.19	10.19	Even though NMI/CDE certificates were obtained in time duty was paid under protest but, no claim for refund was lodged with customs authorities.
10.	Close circuit TV system	162.22	January 1990	Yes, at the rate of 65 per cent.	@135.75 **per cent** for remote zoom lens and @ 181.75 percent for other items	8.60 17.88	No efforts were made to obtain concessional duty either by DPS or by ECIL inspite of such stipulation made clearly in their minutes of January 1987.

2.3.8 Holding of stores

Stores received in the Central Stores of BARC are sent to the concerned Divisional Stores for issue to the respective divisions. The Divisional Stores are responsible for receipt and documentation of materials, their storage, preservation, safe custody etc.

Stores procedure lays down that store units shall carry out

- an annual review of all items held in stock and use at the beginning of each financial year;

- a triennial review in respect of spares held by the stores units for operation and maintenance of plant, machinery and equipment and

- a half yearly review of perishable items.

On the basis of the review, recommendation for the item/ quantity to be declared surplus is made after ascertaining possibility of absorbing the surplus items in main stocks or other divisions. Heads of divisions are to give details for write off and declaration as surplus.

It was seen that review of slow moving items as envisaged in stores procedure was not conducted regularly in HWMS and PREFRE stores. This resulted in keeping the items worth of Rs 35.89 lakhs in stock without use for long periods. Some of these were procured as far back as 1968

It was stated (February 1992) that review was being conducted now and lists were being forwarded to divisional authorities for further action.

It was further seen that there were 1460 items of consumables worth Rs 17.11 lakhs, out of which 1143 items worth Rs 15.56 lakhs lying in Heavy Water Division (HWD), Computer, Isotope, Desalination and Uranium Metal Plant Stores were slow moving. Some of these were procured as far back as in 1964.

Test check of items declared as surplus revealed that the divisions had kept 237 items worth Rs 10.91 lakhs in stock for long periods without use or using sparingly and bulk of them were declared surplus.

Advance procurement of materials not needed within reasonable time and non-utilisation of these items resulted in blocking of funds of Rs 17.11 lakhs for periods upto twenty eight years. This could have been avoided with proper planning for material procurement.

The lists of surplus items should have been circulated to other divisions for their possible use. But this was not done. It was, however, noticed that the divisions were keeping the items for long for 'future purpose' and were declaring them as surplus after they became very old. There is, thus, a need for notifying periodically the items

held in stock for long periods to other divisions in order to find whether these could be of use to others.

BARC also procured consumable items much in excess of actual requirement. Some consumables worth Rs 44.56 lakhs procured during 1960-85 were declared surplus during 1988-91 after keeping these items in stores for 3 to 30 years.

Stores valued at Rs 12.56 lakhs procured during the period from February 1973 to January 1984 were lying unused without any review (December 1992) regarding their requirement. The Department justified (April 1990) the stock holding on the ground of critical nature of the materials. The Department's reply was not tenable as in the absence of a review, nature of the spares lying in stock could not have been known.

Surplus stock of precious metals

Central Stores Unit had a stock of 14407 gms of gold of 99.99 **per cent** purity in the form of gaskets received by the Stores divisions as spares or accessories for various parts of feeder pumps procured by BARC. Out of 14407 gms, 9286 gms of gold were received in FRD in 1965. Though this item was surplus, no action for its disposal was taken upto July 1991. The matter was pursued in audit and the case was referred to Ministry of Finance in August 1991 for advice regarding disposal action. No further action has been taken so far.

Further, the following surplus precious metals were lying in Isotope stores, for final disposal, since September 1989.

Gold pieces 99.99 **per cent** pure	55.76	gms
Silver	114.28	gms
Platinum	115.05	gms

It was stated that materials had been collected in Central Stores Unit (March 1992) for final disposal.

Inflammable items

It was seen that inflammable items were kept by 12 divisions in inflammable stores (of Central Stores) for safe custody for more than 10 years. Though review of the safe custody items was required to be conducted every year, it was not done.

It was also seen from the records that 14 divisions/sections had declared some items as surplus but these were still lying in inflammable stores for disposal since 1986. Final action to dispose these items is yet to be taken (December 1992).

As no value account was maintained, the value of these items could not be ascertained.

2.3.9 Receipts

As per stores procedure, all receipts shall be entered in Goods Receipt register. When the receipts are in accordance with the purchase order (as confirmed by inspection reports/test reports etc., wherever necessary) the receiving section shall prepare a receipt voucher. In cases where stores are not received in good condition or if there are some other discrepancies, receipt vouchers are not issued until the defects are rectified and discrepancies settled. In the following cases, which came to notice of Audit in test check, though advance payments were made supplies had not been accepted due to discrepancies/defects and wanting receipt vouchers :

	Name of Stores	Date of receipt of the stores	Name of the item	Value (Rs in lakhs)	Remarks
(i)	RED Division	February 1981	Centrifugal pump with accessories.	3.09	Proposed for write off.
(ii)	Air Conditioning and Maintenance (ACMP) Stores	September 1985	Pumpset with control panel and accessories	1.87	Control panel not functioning properly.
(iii)	RCND Stores	July 1988	JCE terminals operation with key board mouse.	7.61	Not working properly. Under correspondence.

(iv)	ROMG Stores	August 1989	Shielding flask and skirt assembly of fuelling machine.	27.36	The contractor has not returned the free issue material viz 25.6 tonnes of lead and 16 tonnes of steel (value of lead Rs 2.5 lakhs based on 1984 rates Rs 10000 per MT).
(v)	ELD Stores	September 1989	High Precision Tests Meter.	1.41	Received in damaged condition.
(vi)	RED Divisions	June 1989	Purification system.	2.20	Under correspondence.
			Total	43.54	

For shielding flasks and skirt assembly of fuelling machine procured in 1975-76 at a cost of Rs 27.36 lakhs free issue materials of lead and steel were supplied to the contractor. Balance quantity of 25.6 tonnes of lead and 16 tonnes of steel after fabrication were not returned so far (June 1992). Value of the lead to be returned by the contractor was about Rs 2.50 lakhs (taking into account the price @ Rs 10,000 per MT in 1984) whereas the balance payment due to the contractor was Rs 1.99 lakhs. It was seen that the amount of Rs 13.50 lakhs sanctioned as extra works was released to the contractor by DPS without consulting the division and without deducting the amount of the balance free issue material.

Outstanding advance payments

As per prescribed procedure all payments against purchase orders made to the supplier's pending receipt of Central Stores Receipts Vouchers (CSRVs) should be entered in a register called Advance Payment Register to watch adjustment of these advances. But, this was not done. However in test

check it was noticed that in a number of cases the advances were lying unadjusted for over five years as mentioned below:

Year	Number of suppliers	Outstanding advance (Rs in lakhs)
1977-78	60	17.77
1978-79	105	22.96
1980-81	87	19.72
1981-82	133	164.71
1982-83	266	208.81
1983-84	493	237.14
1984-85	450	291.43
1985-86	308	215.19
1986-87	498	452.25
Total	2400	1629.98

In reply to audit query, DPS stated in October 1992 that individual cases were followed up for settlement and consolidated record was not maintained separately. Specific actions taken or improvements in system made to watch recovery so that such huge outstandings do not pile up and are recovered fast were not indicated.

2.3.10 Stores accounting

Non-maintenance of stock records

The stock cards and registers of capital equipment and furniture and fixtures were not maintained by HWMS Stores. It was stated that the list after renumbering as per rationalised procedure of BARC was not received from the divisions and that action would be taken thereafter.

Return of balance of free issue materials

It was seen from the register maintained in FRD Stores that a number of items have been issued as free issue materials from 1987 onwards to various fabricators for fabrication of items. Test check of few items revealed that the completion certificate and return of balance materials in respect of 16 cases from 1986 to 1989 were not noted in the register. The balance left over materials were not handed over to the stores by the indenting officers. According to the stores procedure before the final payment is released to a contractor, copy of a certificate for returning balance free

issue materials shall be endorsed to the parent stores unit by the engineers concerned. This certificate was also not received by the stores in many cases. In the absence of these, it could not be verified whether the balance free issue materials were returned by the contractor.

2.3.11 Physical Verification

As per stores procedure, physical verification of stock items was to be conducted by an independent team of DPS. The periodicity of physical verification for different category of stores is once in two years for consumable items, once in three years for capital and furniture items and once in six months for valuables and precious metals.

Physical verification of capital items in DEED Stores and Air Conditioning and Mechanical Plant Section (ACMPS) was not conducted after 1985-86.

The discrepancies pointed out by the verification team in 1985-86, 1986-87 and 1989-90 in the following stores were not reconciled so far:

Name of stores	Year of verification	Number. of discrepancies
NPD Stores	1986-87	2233
DEED Stores	1985-86	1609
ACMP Stores	1985-86	2213
ROMG Stores	1989-90	1126
Total		7181

Nature of the discrepancies was as under:

Name of Stores	Items not produced for verification	Items without numbers	Items with wrong No.or duplicate No.	Items allotted Nos. but pointed with different items	Items transferred but not verified	Total number of discrepancies
NPD Stores	1773	445	-	15	-	2233
DEED Stores	961	530	-	114	4	1609
ACMP	1462	707	31	-	13	2213

Stores						
ROMG Stores	145	860	37	-	84	1126

Thus out of total 7181 discrepancies, 4341 related to items not produced for verification. No action was taken on these discrepancies.

As per circular issued by BARC in September 1980, in addition to physical verification, the valuable materials shall be verified by an independent committee of Accounts Officer, Stores Officer and a Scientific Officer. Though DEED stores has precious metals in stock, the verification of precious metals by independent committee was not conducted so far (June 1992).

2.3.12 Other interesting points

Central Workshop undertakes the work of fabrication of various items as per requirement of different divisions in BARC/NPCIL. Scrutiny of registers maintained in safe custody stores in Central Workshop revealed that there were 1325 items of raw materials and 1318 items of finished jobs (fabricated items) lying without collection by the respective divisions from 1980-81 onwards. The year wise break-up is as follows:

Year	Balance Raw Materials (No. of items)	Balance finished jobs (No. of items)
1980-81	42	12
1981-82	100	42
1982-83	170	112
1983-84	88	160
1984-85	58	92
1985-86	79	126
1986-87	89	102
1987-88	147	91
1988-89	183	154
1989-90	148	164
1990-91	274	263
TOTAL	1325	1318

Besides, there were about 1399 items in respect of 123 jobs pertaining to the period 1969-80 which were not collected by the divisions.

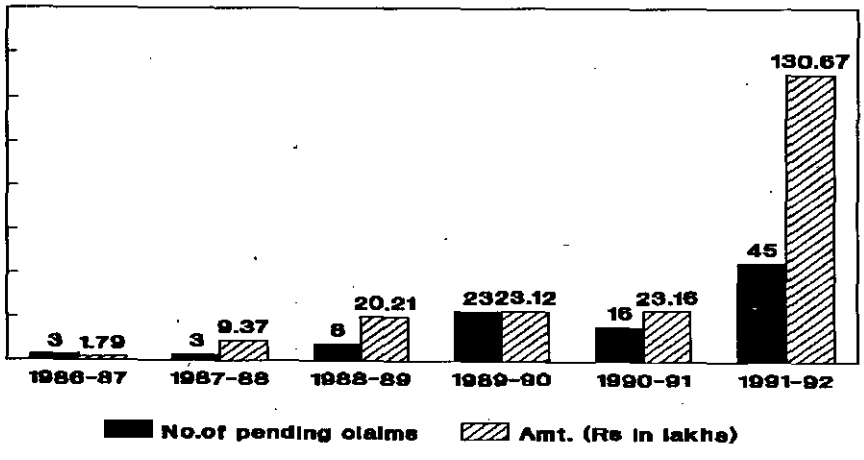
No review of the unissued fabricated items was conducted though some of these items were lying in safe custody stores from 1969-70 onwards. The divisions which had requested for fabrication did not collect the items. The raw materials and fabricated items might have lost utility due to passage of time and non collection of fabricated items has led to wastage of materials, time, manpower etc. As no value accounts were maintained, the value of raw materials and money spent for fabrication could not be ascertained.

Outstanding insurance claims

The goods imported from foreign suppliers are insured by DPS with two insurance companies at Bombay who settles the insurance claims lodged in this connection with their Survey Department. There were 98 pending claims worth Rs 208.92 lakhs with Insurance companies during 1986-92 as under:

Year	Number of pending claims	Amount of claim **(Rs in lakhs)**
1986-87	03	1.79
1987-88	03	9.37
1988-89	08	20.21
1989-90	23	23.12
1990-91	16	23.76
1991-92	45	130.67
Total	98	208.92

Outstanding claims



Other pending claims

Whenever goods are short received or received in damaged condition and replacements are not received, claims are raised against the Railways, Transport carrier etc as the case may be. It was seen that 93 such claims valuing Rs 14.99 lakhs were pending as under:

Sl No	No of claims	Amount (Rs in lakhs)	Year from which claim pending	Claims pending with
(i)	17	0.68	1984 onwards	Railways
(ii)	2	0.42	1988	Transport carrier
(iii)	22	7.48	1987 onwards	Suppliers
(iv)	17	5.76	1989 "	"(Imported items)
(v)	11	0.38	1989-90 1990-91	Suppliers
(vi)	24	0.27	1977-78	- do -
Total	93	14.99		

As these items are pending for long, action is required to be taken expeditiously for early realisation of the claims.

2.3.13 Non-production of files

Resident Audit Parties are stationed in DPS at Bombay for conducting concurrent audit of purchase cases finalised by DPS. Requisitions for purchase files are made from time to time for audit scrutiny. A large number of requisitions for files were not complied with inspite of repeated reminders. The number of such pending requisitions, pertaining to 1981-90, was 2078 as on 30th September 1992. The cases not submitted to Audit involved purchase value of Rs 24812.88 lakhs.

2.4 Unutilised stores

According to the Department of Atomic Energy Stores procedure, Stores units should carry out in the beginning of every financial year, a review of all items held in stock, except for spares held for operation and maintenance of plant/machinery/equipment which are to be reviewed once in three years. Items for which there was no demand for a period of two years or the issues during the previous two

years had been very small as compared to the stock, might be considered surplus. In the case of spares held in stock the extent of surplus would be determined on the basis of recommendations of the heads of the divisions.

In Indira Gandhi Centre for Atomic Research (IGCAR) at Kalpakkam, it was noticed in test check (December 1989) that materials worth Rs 223 lakhs procured 10 to 15 years ago were lying unused. These items were not declared surplus as reviews contemplated as per the prescribed procedure were not carried out. The users on whose account these stores were procured had not declared them 'surplus' but had stated that some items were being drawn from stores and the remaining items would be drawn as and when necessary. Admitting the fact IGCAR stated (January 1992) that the actual inventory lying in stores which had not yet been assessed by them (September 1992) might be even 5-10 times the inventory shown in the list sent by Audit. IGCAR did not furnish list of stores (with their value) idling for more than seven years in their stores without issue as on 31st March 1992, though the information was called for by Audit. Further scrutiny revealed that out of the stores of Rs 223 lakhs lying unused as noticed in December 1989, stores worth Rs 172 lakhs were still not used (July 1992).

IGCAR stated (December 1992) that excess stores had to be stocked in stores as "In major projects like FBTR and KARP one is required to indent some surplus material(10 to 15 **per cent**) to allow for possible design changes, wastage due to fabrication difficulties, trials and future use (those items which take long time to procure)". It was also clarified (December 1992) that sometimes the suppliers stipulate minimum order for one full charge of 10 to 25 tonnes of furnace used for manufacture depending on the product which the Department accedes to whenever they were confident of using the surplus material in the continuing activities of IGCAR. IGCAR however could not furnish the extent of surplus stores on this account.

Audit scrutiny revealed that idle stores had accumulated due to one or more of the following factors:

- Delay in commissioning of the projects and consequent holding of stores for longer periods than anticipated.

- Transfer of surplus material from other projects of DAE to IGCAR stores without ascertaining the actual requirements.

- Premature procurement and shifting of priorities of R&D programmes after procurement of materials.

- Rush of procurement of materials to utilise the budgetary grant so as to avoid lapse of grant.

- Delay in taking action to dispose of surplus stores by end-users as contemplated in the DAE stores procedure.

- Not locating possible user divisions within a reasonable time.

DAE admitted (December 1992) that stores organisation needed to be improved to provide detailed information about items of idle stores so as to avoid redundant indenting. It was further stated that steps were being taken to introduce effective inventory control methods, within one or two years, and more order would be restored in material handling.

2.5 Idling of equipment

2.5.1 The purchase order files of the Directorate of Purchase and Stores (DPS) did not have information regarding receipt, installation and commissioning of equipment procured. As per the stores procedure, one of the seven copies of the central stores receipt vouchers is to be sent to the purchase unit of DPS and thus the purchase files should have such information. But, this procedure was not being followed in all cases. As a result, receipt and installation of equipment for which purchase orders had been placed could not be monitored by DPS. However, in test check of records of stores and other units, the under mentioned cases of non-installation/delayed installation of equipment etc , involving Rs 187.92 lakhs, came to notice:

(i) Against an indent placed in March 1986, purchase order for supply of basic outfit for secondary ion mass spectrometer was placed in February 1988 at foreign exchange equivalent of Rs 152 lakhs.

The equipment was received in December 1988, after 33 months of indent, at the Indira Gandhi Centre for Atomic Research

(IGCAR), Kalpakkam but could not be installed till July 1989 due to pre-installation facilities viz voltage room, temperature earthing, humidity, vibration, magnetic field etc being not ready.

(ii) A micro-computer was required by 31st March 1989 at the Centre for Advanced Technology (CAT), Indore. As the requirement was projected as urgent, codal formalities of procuring the item through open tender were dispensed with and the case was finalised by issue of limited tender enquiry. Against the purchase order placed in July 1989, the computer costing Rs 13.64 lakhs was received by CAT in March 1990. The computer could not be put to use as the check point facility was not working and inspite of repeated reminders the firm had not rectified the defects. The computer which was needed urgently by the user in August 1988 was lying unused. (September 1992).

(iii) A purchase order for an equipment urgently required by IGCAR was placed on a foreign firm in September 1989. The equipment costing Rs 10.04 lakhs was received in March 1990 and remained idle till June 1991 owing to some defects .

(iv) Based on an indent raised by Nuclear Fuel Complex (NFC), in May 1988, for an urgent requirement of belt type electric resistance vacuum furnace, the purchase order was placed on a firm after a year i.e. in May 1989 at a cost of Rs 7.18 lakhs. The furnace was received in June 1990 by NFC who informed (July 1990) DPS that the commissioning of the furnace would be taken up at a later stage as the site was not ready due to delay in civil works. The furnace could not be commissioned till January 1992 due to leakage at the furnace bottom flangs. Its commissioning was now stated to be underway.

(v) Purchase Order was placed on 10th April 1990 on a firm for stainless steel double module glove boxes at a cost of Rs 5.06 lakhs. The material was received by the Power Reactor Fuel Reprocessing Plant (PREFRE) Stores at Tarapur in two spells in October 1990 and January 1991. As per the purchase order, the materials were required by the indenting officer by mid October 1990. However, the glove boxes were still to be delivered to the indenting officer (October 1992). DPS stated (October 1992) that necessary civil works required for installation of these glove boxes were not ready.

2.5.2 It was also noticed that capital equipment worth Rs 68.15 lakhs were issued much after their receipt as detailed below:

	Name of Stores	Value of item (Rs in lakhs)	Year of purchase	Year of issue
(i)	Desalination Division (DEED) Stores	2.63	1968,78,88	1989,90,92
(ii)	Uranium Metal Plant (UMP) Stores	4.78	1977 to 87	1991
(iii)	Central Work Shop (CWS) Stores	44.11	1974,75	1987
			1976,77	
		16.63	1982,83	1987
	Total	68.15		

Thus the equipment were procured much in advance of their requirements resulting in blocking of funds to the tune of Rs 52 lakhs for periods ranging from 10 to 12 years and Rs 16.15 lakhs for over five years.

Further, capital equipment worth Rs 50.25 lakhs procured during 1965 to 1988 had not been issued as detailed below:

	Name of Stores	Value (Rs in lakhs)	Year of procurement
(i)	DEED Stores	4.59	1979, 1983 1984, 1986
(ii)	FRD Stores	45.66	1965 to 1988
	Total	50.25	

In respect of (i) above, it was stated (February 1992) that they are in use with the user department but transactions were not reflected in the stock records.

In respect of (ii) above, it was stated (February 1992) that a committee has been formed for numbering of the items as per revised procedure of Bhabha Atomic Research Centre (BARC) effective from 1986 and action to be taken will be suggested by the committee.

2.5.3 Undermentioned cases of delay in commissioning of equipment for periods ranging from three to five years, involving of Rs 191.52 lakhs, also came to notice:

(i) Horizontal Boring and Milling Machine purchased at a total cost of Rs 126 lakhs was received at BARC in February 1984 and its assembly was completed in August 1984. The machine could not be commissioned satisfactorily due to certain defects. The foundation of the machine was built by Civil Engineering Division of BARC at a cost of Rs 2.25 lakhs. After rectification of the defects the machine was put into operation in December 1987 i e after three years.

(ii) Vertical boring and milling machine purchased at a total cost of Rs 55 lakhs was received at BARC in November 1984 and its mechanical assembly was done in January 1985. Due to various technical defects, it could not be commissioned then. Though the machine was commissioned in October 1986, it was put to use in November 1987 only. There was delay of three years in commissioning of the equipment .

(iii) Purchase Order dated November 1985 was placed on a firm at a total cost of Rs 10.52 lakhs for Design Engineering Fabricated Supply of Heavy Water Vapour Recovery System for the Research Reactor Dhruva. The materials were delivered in Stores in May 1986. After carrying all tests it was expected to be commissioned by end of September 1986. However, the system was commissioned in November 1991 after a delay of five years.

Impact of delay in commissioning of these equipment on the projects/jobs was called for in audit (October 1991), the response was awaited (March 1993).

2.6 Non-recovery of share of State Government in a project

A project on "Radiation treatment of Sewage Sludge" in Gujarat was sanctioned by Department of Atomic Energy

(DAE) in January 1983, at a cost of Rs 87.20 lakhs. The sanctioned cost was increased by Rs 10.35 lakhs in July 1990. The site for the project was provided free at Gajrawadi, Baroda by Baroda Municipal Corporation.

The project which was to be completed by April 1986, was completed only in June 1990 and became operational in November 1990 with raw as well as digested sludge provided by Baroda Municipal Corporation.

While setting up the project, it was agreed between DAE and the Government of Gujarat that latter will bear one-third of the capital cost and one-fifth of the operation and maintenance cost during the Research and Development (R&D) period. Capital expenditure of Rs 91.28 lakhs was incurred by DAE during 1984-90. Accordingly Government of Gujarat was to pay Rs 30.43 lakhs (one-third of the capital cost) to DAE which has not been realised so far. Expenditure of Rs 10.06 lakhs incurred under "salaries" during 1984-90 (when the project was under construction) was not added to the capital cost. On that basis an additional amount of Rs 3.35 lakhs would be due from the Government of Gujarat.

The State Government had not yet (April 1992) taken over the project on the ground that it had made clear that such action was contingent upon the success of the project. DAE decided (January 1991) to fully fund the project for standardisation of the operation.

Thus, an amount of Rs 33.78 lakhs was yet to recovered from the Government of Gujarat. DAE stated (June 1991) that the matter was being pursued.

The matter was referred to the Department again in October 1992; their response is awaited (March 1993).

2.7 Irregular award of contract

Bhabha Atomic Research Centre (BARC) invited public tenders in August 1981 for construction of the main laboratory building for expansion projects of Power Reactor Fuel Reprocessing (PREFRE), Tarapur. The estimated cost of the work was Rs 317.92 lakhs. The offers received from three firms were : firm 'A' for Rs 381.65 lakhs, firm 'B' for Rs 365.01 lakhs and firm 'C' for Rs 324.89 lakhs. The work was awarded to the highest tenderer firm 'A' at a cost of Rs 358.91 lakhs in June

1982 ignoring the two lower tenders. The work was completed at a total cost of Rs 405.85 lakhs in January 1986 against scheduled date of completion of January 1985.

As the lowest tenderer, firm 'C' had not executed any job for the Department of Atomic Energy (DAE), an inspecting team (Committee) was constituted in January 1982 to assess their capability to execute the work. The Committee in general felt that the lowest tenderer could execute quality work with the type of supervision exercised by the department. The lowest offer was, however, not preferred on the ground that shuttering material would have to be acquired by the firm for quality work ignoring the report of the inspecting team that the firm had adequate shuttering materials. Even after evaluation of the costs of both the firms, the offer of firm 'A' was higher by Rs 20 lakhs.

Firm 'A' had agreed to a grace period of 12 months beyond the contract period for reckoning compensation which was payable, subject to a limit of Rs 2.5 lakhs per month if they were forced to stop work due to delay in supply of materials etc. The financial implication of this clause was not assessed. As Firm 'C' stipulated an increase of three **per cent** over the tendered rates for agreeing to keep the grace period of 12 months after the contract period, Rs 9.78 lakhs was added to their tendered cost for evaluation. The compensation for delay in completion due to departmental delays stipulated by firm 'C' was (Rs 0.50 lakh per week which was less than firm 'A'. While the reasons for claiming the compensation were the same in both the cases, in the case of firm 'A' the financial implication was not assessed. However in the case of firm 'C', the Department added Rs 26 lakhs (Rs 0.50 lakhs x 52) evaluation Similar action should have been taken to add of Rs 30 lakhs (Rs 2.5 lakh x 12 months) in the offer of firm 'A'. If this amount of Rs 26 lakhs was not added to firm 'C' the difference in the evaluated costs of both the firms would have been Rs 46 lakhs.

Six **per cent** rebate was offered by firm 'A' after knowing the tendered cost of all the parties. This should not have been considered. However, even after considering this rebate, the tender cost of firm 'A' worked out to be higher by Rs 33.86 lakhs.

The Department combined this work with another work i.e. construction of service buiing at PREFRE and offered both the works to firm 'A'. The second lowest offer of firm 'B' was not considered as this firm had not quoted for the other work, ie, the service building. It was stated the combined costs of firm'A' was lower by Rs 10.76 lakhs than by giving the works to two lowest tenderers separately. Combination of this work with another work for which separate tenders were called for was improper. Thus, DAE intended to save Rs 10.76 lakhs by awarding both the works to firm 'A', but ultimately incurred additional expenditure of Rs 44 lakhs which could have been avoided, had the work awarded to firm 'C'.

DAE stated in February 1993 that the report of the inspecting team was considered in depth by the tender committee and it was stated in their report that the works inspected were not at all comparable in nature to the Nuclear Containment Structures to be built. The reply is not tenable, as the inspecting team was well aware of the structure to be built at the time of giving their recommendation for this work for the firm 'C'. Regarding addition of Rs 26 lakhs in the evaluated offer of firm 'C', it was stated that similar addition in respect of the firm 'A' was not made as the latter had agreed to grace period without reservation or precondition. But, both firms had accepted grace period of 12 months.

The Department stated that a single contractor for both the works was preferred due to site constraints. The reply is not tenable as the site constraints should have been known to the department at the time of invitation of tenders.

2.8 Departmentally managed undertakings

Following departmentally managed undertakings functioning under the Department of Atomic Energy were required to prepare proforma accounts on the commercial operations every year to monitor their financial viability:

(a) Nuclear Fuel Complex
(b) Heavy Water Pool Management
(c) Rajasthan Atomic Power Station I
(d) Rajasthan Atomic Power Station II
(upto 16th September 1987)

(e) Madras Atomic Power Station
(upto 16th September 1987)
(f) Tarapur Atomic Power Station
(upto 16th September 1987)

The proforma accounts of Heavy Water Pool Management for the years 1982-83 onwards have not been sent for audit so far (March 1993) reportedly because no decision has been taken on preparing the proforma accounts for these years.

The expenditure and receipts (Heads 4801 ,4861, 2801, 0801) under "Fuel inventory" and "Heavy Water Pool Management" reflected in the budget and Finance Accounts of the Department of Atomic Energy for the years 1989-90 to 1991-92 are given below:

Heavy Water Pool Management **(Rs in crores)**

	Budget	**Actuals**
1991-92		
Expenditure	75.40	71.14
Less Receipts	79.28	13.77
Net Expenditure	Surplus 3.88	57.37
1990-91		
Expenditure	77.50	54.28
Less Receipts	53.05	65.61
Net Expenditure	24.45	Surplus 11.33
1989-90		
Expenditure	64.20	49.24
Less Receipts	40.16	44.45
Net Expenditure	24.04	4.79

Fuel Inventory

1991-92		
Expenditure	206.00	153.28
Less Receipts	115.23	-
Net Expenditure	90.77	153.28

1990-91			
Expenditure		99.93	124.19
Less Receipts		124.29	105.83
Net Expenditure	Surplus	24.36	18.36
1989-90			
Expenditure		96.82	79.27
Less Receipts		78.08	71.54
Net Expenditure		18.74	7.73

The proforma accounts of Nuclear Fuel Complex for the years 1987-88 and 1988-89 are under certification (March 1993). The proforma accounts of Nuclear Fuel Complex for these years revealed the following:

		1987-88	**1988-89**
		(Rs in crores)	
1.	Capital at the end of the year	23.99	25.89
2.	Net Block	19.69	20.42
3.	Depreciation	4.30	5.47
4.	Interest on capital	11.37	14.66
5.	Return on capital	0.88	18.31
6.	Percentage return on capital	0.46	8.21

The figures available in budget and Finance Accounts for the years 1989-90 to 1991-92 are given below:

	(Rs in crores)	
	Budget	**Actual**
1991-92		
Revenue Expenditure	162.56	142.55
Less Receipts	(-)156.35	(-)128.71
Other Expenditure	36.00	35.05
Net Expenditure	41.21	48.89
1990-91		
Revenue Expenditure	127.30	119.12
Less Receipts	(-)162.73	(-) 74.09
Other Expenditure	70.69	36.24
Net Expenditure	35.26	81.27

1989-90

Revenue Expenditure	111.93	106.99
Less Receipts	(-) 74.81	(-) 49.10
Other Expenditure	68.80	27.91
Net Expenditure	105.92	85.80

Proforma Accounts of Rajasthan Atomic Power Station I and II and Tarapur Atomic Power Station for the years 1986-87 and 1987-88 (ending 16th September 1987) and Madras Atomic Power Stations for the year 1987-88 (ending 16th September 1987) have been certified. The figures available in budget and Finance Accounts for the years 1989-90 to 1991-92 are given below:

(Rs in crores)

	Budget	Actuals
Rajasthan Atomic Power Station-I		
1991-92		
Expenditure	59.65	59.41
Less Receipts	33.29	6.94
Net Expenditure	26.36	52.47
1990-91		
Expenditure	59.46	54.70
Less Receipts	21.78	11.17
Net Expenditure	37.68	43.53
1989-90		
Expenditure	49.08	43.73
Less Receipts	13.22	9.06
Net Expenditure	35.86	34.67

Rajasthan Atomic Power Station -II

1991-92

Expenditure	52.68	55.00
Less Receipts	56.83	63.19
Net Expenditure	Surplus 4.15	Surplus 8.19

1990-91

Expenditure	51.31	20.46
Less Receipts	49.72	56.58
Net Expenditure	1.59 Surplus	36.12

1989-90

Expenditure	46.18	50.72
Less Receipts	48.79	42.98
Net Expenditure	Surplus 2.61	8.24

Tarapur Atomic Power Station

1991-92

Expenditure	74.45	86.53
Less Receipt	89.67	97.54
Net Expenditure	Surplus 15.22	Surplus 11.01

1990-91

Expenditure	60.19	70.42
Less Receipts	79.98	87.19
Net Expenditure	Surplus 19.79	Surplus 16.77

1989-90

Expenditure	47.84	59.55
Less Receipts	78.10	63.72
Net Expenditure	Surplus 30.26	Surplus 4.27

Madras Atomic Power Station

1991-92

Expenditure	124.12	136.82
Less Receipts	121.99	154.91
Net Expenditure	2.13	Surplus 18.09

1990-91

Expenditure	92.35	94.84
Less Receipts	82.86	110.22
Net Expenditure	9.49	Surplus 15.38

1989-90

Expenditure	100.39	69.10
Less Receipts	119.25	60.41
Net Expenditure	Surplus 18.86	8.69

2.9 Follow up on Audit Reports

The Lok Sabha Secretariate issued instructions (April 1982) to all the Ministries requesting them to furnish notes indicating remedial/corrective action taken by them to the Ministry of Finance (Department of Expenditure) on the various paragraphs contained in the Audit Reports of the Comptroller and Auditor General of India as soon as they were presented to the Parliament. Such notes were required to be submitted even for paragraphs which were not selected by the Public Accounts Committee for detailed examination.

A review of the 'Action Taken Notes' on the observations of Audit contained in the Reports for the last five year's revealed that the Ministry has not submitted (March 1993) such notes on the following paras:

Audit Report Number and Year	Para No.	Caption
1. No. 2 of 1992	8.4	Avoidable extra expenditure (Flow meter).
2. No. 2 of 1992	8.5	Avoidable extra expenditure by reinvitation of bids.

CHAPTER III

Department of Electronics

3.1 Unrealistic assessment of Power requirements

Electronic Research and Development Centre (ERDC), Trivandrum, a unit of Department of Electronics (DOE) from April 1988, entered into an agreement with Kerala State Electricity Board (KSEB) in February 1984 for supply of maximum load of 1000 kilo volt amperes (KVA). The contract interalia provided that ERDC could either increase or decrease the maximum demand of 1000 KVA after giving a notice of six months. The charges were to be paid on the maximum demand established during a month or 750 KVA (being 75 **per cent** of the contracted demand) whichever was higher.

A review of power consumption during the period from April 1988 to March 1992 revealed that the consumption ranged between 137 (August 1988) and 619 KVA (May 1991) which was much less than the contracted demand.

ERDC stated in December 1991 that the Centre reached 750 KVA of recorded maximum demand in October 1991 which was 75 **per cent** of the contracted demand. It further stated that due to the establishment of software training centre with IBM computer its demand for power was expected to increase and, therefore, it was not necessary to revise the contract demand. The contention of the Centre was not tenable since even after establishment of the main IBM Computer and the related UPS system in ERDC building in January 1992, there was no increase in the consumption. In fact, there was a decrease in the recorded maximum demand during January 1992 (396 KVA) to March 1992 (274 KVA). Further, the Centre had later accepted (June 1992) the audit observation that the maximum recorded demand in October 1991 was only 511 KVA and the recorded maximum demand in subsequent months till March 1992 was only between 274 KVA and 562 KVA. ERDC had also reassessed the power requirements in March/ April 1989 and having found the contract demand of 1000 KVA to be high, had requested KSEB to revise the maximum demand to 600 KVA. The matter was not pursued thereafter with KSEB.

ERDC accepted the above facts (June/July 1992) and stated that action would be initiated to reduce the maximum demand to 700 KVA. Reasons for not pursuing the

reduction of maximum demand assessed in 1989 were stated as uncertainties about the development activities of the Centre and consequent power needs and continued occupation of ERDC building, contrary to its earlier thinking, by Electronics Regional Testing Laboratory (ERTL) another unit of DOE, whose power requirement was also met by ERDC. The reply is not convincing as even after meeting the power needs of ERTL the recorded maximum demand was much less than 600 KVA except on two occasions when it was marginally higher, in April 1991 and May 1991. Thus the estimated need of 600 KVA as worked out by ERDC in 1989 was realistic. In fact, ERDC ought to have reviewed its power needs in 1988 itself. As the consumption did not even exceed 300 KVA upto April 1990 except on two occasions, the contracted demand could have been brought lower even to 500 KVA from the latter half of 1988 i e after the six months notice period. With the reduction of the contracted demand to 600 KVA with effect from November 1989 i.e. six months after the reference to KSEB in April 1989, extra expenditure of Rs 3.66 lakhs between November 1989 to March 1992 could have been avoided.

ERDC has entered into a revised agreement with KSEB in August 1992 for maximum demand of 700 KVA. But, maximum demand recorded for the period April to October 1992 had ranged between 169 and 238 KVA only.

3.2 Follow up on Audit Reports

The Lok Sabha Secretariate issued instructions (April 1982) to all the Ministries requesting them to furnish notes indicating remedial/corrective action taken by them to the Ministry of Finance (Department of Expenditure) on the various paragraphs contained in the Audit Reports of the Comptroller and Auditor General of India as soon as they were presented to the Parliament. Such notes were required to be submitted even for paragraphs which were not selected by the Public Accounts Committee for detailed examination.

A review of the 'Action Taken Notes' on the observations of Audit contained in the Reports for the last five years revealed that the Ministry has not submitted (March 1993) such notes on the following paras:

Audit Report Number and year	Para No.	Caption
No.7 of 1989	34	Administrative lapses in assessment of accommodation requirements.
No.2 of 1990	37	Premature release of grants-in-aid.
No.2 of 1990	38	Procurement of a Computer system.
No.2 of 1992	9.2	Failure to develop and deliver to Defence.
No.2 of 1992	9.3	Delay in development and supply to Defence.

CHAPTER IV

Ministry of Environment and Forests

4.1 Central Pollution Control Board - audit review

4.1.1 Introduction

Parliament enacted, in March 1974, the Water (Prevention and Control of Pollution) Act, which required Central Government to constitute a Board to be called "Central Board for the Prevention and Control of Water Pollution" (CBP & CWP), under the then Ministry of Works and Housing, to perform the functions assigned exercising the powers conferred under this Act. The Board was subsequently brought under the Ministry of Environment and Forests in 1981. Consequent upon enactment of Air (Prevention and Control of Pollution) Act 1981, the Board was entrusted with, additional responsibilities from March 1981 in regard to air pollution. It was renamed as Central Pollution Control Board **(CPCB)** in October 1988 and noise pollution also was brought under the ambit of its activities.

The Act applies to the States of Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Rajasthan, Tripura and West Bengal and the Union Territories and it would also apply to any other State which adopts this Act by resolution under clause (1) of article 252 of the Constitution.

The Act provided for constitution of State Pollution Control Boards in the States and for laying down their functions. During the period between March 1974-May 1992, 25 State Boards became operational. As regards Union Territories, the Act stipulated that no State Board would be constituted and the Central Board would exercise and perform the functions of a State Board for an Union Territory.

With a view to augmenting the resources of the Central and the State Boards, the Water (Prevention and Control of Pollution) Cess Act, 1977 was enacted providing for levy and collection of a cess on water consumed by certain industries and by local authorities.

4.1.2 Scope of audit

CPCB is audited under Section 14 of the Comptroller and Auditor General's (Duties, Powers and Conditions of

Service) Act, 1971. This review is based on test check of activities of CPCB during the Seventh Five Year Plan (1985-90) and the annual plans for 1990-91 and 1991-92.

4.1.3 Highlights

General

- **CPCB is not adequately empowered to discharge its functions effectively despite being the apex body at the national level for pollution control.(Para 4.1.5)**

Manpower

- **Twenty one per cent of the sanctioned scientific/ technical posts remained vacant eventhough CPCB themselves were competent for recruitment of such personnel to the extent of sanctioned strength. (Para 4.1.6)**

Standards

- **Under the Pollution Control Act, CPCB was to lay down standards for quality of water and air.Quality of pollutants discharged were to be regulated by the State Boards with reference to the standards developed. CPCB had not yet evolved any mandatory standards for water and air quality. It directed its efforts towards development of Minimal National Standards for trade effluents and sewage discharge which came under the purview of the State Boards and not CPCB. (Para 4.1.7)**

Water Pollution

- Biological monitoring and eco-toxicological studies on river Yamuna, which was to generate early warning system, and bioaccumulation monitoring were not completed. In this connection, CPCB failed in eliciting cooperation of the Industrial Toxicological Research Centre (ITRC). CPCB installed two automatic water quality monitoring stations but due to improper selection of site and incompatibility of the equipment, the objective of assessing pollution load on river Yamuna caused by the city of Delhi could not be

achieved. Nine automatic water quality monitoring stations, which were planned to assess the improvement in the water quality due to abatement measures and to give early warning to down-stream users of adverse water quality, could not be installed. Nine river basin studies were to be undertaken, completed and published by November 1988 to December 1991. However, reports in respect of only three studies had been completed (and yet to be published), report on one study was under preparation, two studies were under progress and action was yet to be initiated in respect of the remaining three studies. Revised target dates for completion and publication had not been set. (Para 4.1.8)

- A project sponsored by the Department of Ocean Development for monitoring of Indian coastal water which continued for six years was eventually closed, after spending Rs 115 lakhs without any result. (Para 4.1.10)

Air Pollution

- Since promulgation of the Air Act, CPCB could only initiate preliminary work on air quality improvement and action towards prevention, control and abatement of air pollution had not been initiated. Coordination between CPCB and the State Boards was not effective. Out of three automatic air quality monitoring stations, received under European Economic Community (EEC) collaborative programme, only two stations were found to be in order. These stations also did not perform well due to software and power problems and non-availability of trained personnel etc. (Para 4.1.9)

- Inventorisation of air polluting industries had not been completed so far. The inventory prepared eight years back was also not updated. (Para 4.1.11)

Equipment and Stores

- CPCB procured chassis and equipment for mobile laboratories under Laboratory Development Programme which could not take off resulting in idling of an expenditure of Rs 25.03 lakhs. (Para 4.1.12)

Accounting

- **Assets worth Rs 4819.43 lakhs received under foreign collaborative projects were not reflected in the accounts. Funds from collaborative projects to the tune of Rs 60 lakhs were diverted during the years 1990-92. (Para 4.1.13)**

Miscellaneous

- **Inadequate planning, lax supervision and non-enforcement of the provisions of the contract resulted in CPCB incurring an additional expenditure of Rs 29.15 lakhs. (Para 4.1.15)**

- **Publications worth Rs 18.00 lakhs since 1978-79 were lying in the Stores which showed improper assessment of demand. Three hundred and forty nine books costing Rs 1.42 lakhs had been found missing from the library. (Para 4.1.16)**

4.1.4 Organisational set up

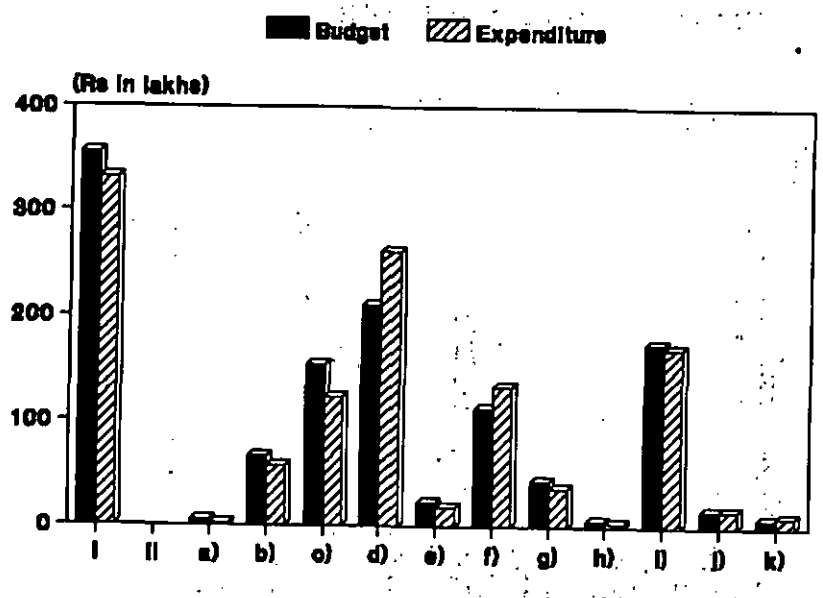
CPCB is the national apex body for prevention and control of water and air pollution. It coordinates activities of the State Boards in nation-wide programmes of water and air pollution control. Main functions of CPCB are directed (i) to promote cleanliness of wells and streams and (ii) to improve quality of air and prevent, control or abate air pollution in the country.

CPCB has a full time Chairman, a Member-Secretary, five members representing the Central Government, five members nominated from among the members of the State Boards, three non-officials to represent interests of Agriculture, Fisheries, Industry, Trade or any other interest and two members to represent companies or corporations owned, managed or controlled by the Central Government. None of the non-official members nominated by the Central Government in the reconstituted CPCB (December 1991) belonged to the specified fields, i e , Agriculture, Fisheries, Industry etc , but reportedly belonged to 'any other interest'. The Ministry stated (November 1992) that these non official members represent public health, media and technical education.

CPCB had six zonal offices at Chandigarh, Kanpur, Calcutta, Shillong, Bangalore and Vadodara to coordinate

i.	Laboratory Development and maintenance	174.50	170.13
j.	Information, Library and Data Processing Services	16.00	16.63
k.	Pollution Control camps and publication	8.00	9.87
	Total	1185.50	1163.01

Expenditure 1985-90 (7th Plan)

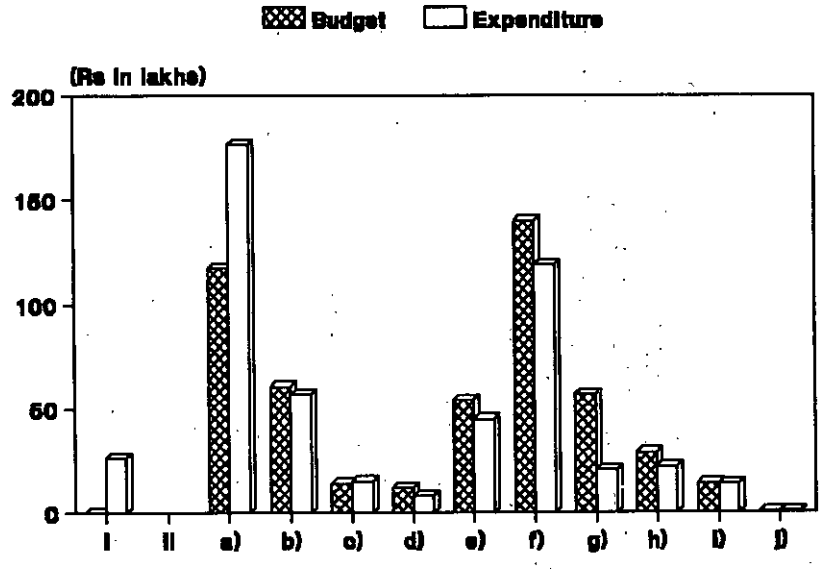


Expenditure during Annual Plans (1990-92)

	Head of Account	Total plan budget	Expenditure
		(Rs in lakhs)	
I	**Building Project (Plan)**	-	26.21
II	**Projects and Programmes (Plan)**		
a.	Monitoring (assessment of Pollution loads through monitoring and survey of status of Air and Water through field measurement)	117.39	176.45
b.	Laboratories	61.00	57.44
c.	Standard Developments	14.00	15.14
d.	Training	12.00	8.19

e.	Establishment of Data Base System	54.26	44.99
f.	Pollution Control Enforcements	140.00	119.26
g.	Development of Pollution Control Technology and Low Waste process technology	57.20	20.58
h.	Publications	29.00	21.92
i.	Management of Hazardous Waste	14.39	13.75
j.	World Bank aided projects	0.76	0.66
	Total	500.00	504.59

EXPENDITURE FOR 1990-1992



4.1.6 Staff strength

As on 31st March 1992, CPCB had 83 scientific, 138 technical and 172 ministerial staff against sanctioned strength of 94, 186 and 205 respectively. There were no norms for the ratio between scientific and non-scientific staff. Twenty one **per cent** of the sanctioned strength of the scientific / technical posts remained vacant though CPCB themselves were competent for recruitment of such personnel.

4.1.7 Development of Standards

(i) Standards for water pollution

Under Water (Prevention and Control of Pollution) Act, 1974, CPCB is responsible for laying down, modification or annulment of standards for streams or wells in consultation with the State Governments. The State Boards in turn are responsible for laying down standards for treatment of sewage and trade effluents to be discharged into any particular stream taking into account minimum fair weather dilution and the tolerance of pollution in the water of the stream after discharge of such effluents. They are also to lay down standards for discharge of sewage and sullage.

CPCB had initiated river basin studies in respect of six major river basins during the Seventh Plan period and by 1990 they had completed studies for four river basins and reports were under process. On the basis of these studies a map was prepared classifying different stretches of various major rivers based on the water use. The map also gave maximum allowable pollution parameters which the water in that stretch could support. These were more by way of guiding standards than mandatory levels for the State Boards to follow and develop their own pollution standards. So far the Ministry had not notified any of these standards for streams or wells in any State. CPCB was also not aware of any standards for pollution developed by the State Boards based on the minimum fair weather dilution and pollution level permissible for any stream in the States.

(ii) Standards for air pollution

Under Air (Prevention and Control of Pollution) Act, 1981, CPCB has to lay down standards for quality of air. The State Boards on the other hand have to lay down standards for discharge of gaseous pollutants, including noise, having regard to standards for air laid down by CPCB. They are also to advise the State Governments on the matter of demarcation of air pollution control area.

CPCB has not yet developed standards for air quality in the absence of which standards of air pollution can not be developed by the State Boards. In the absence of standards for air quality and air pollution, the State Governments also can not identify air pollution control

areas to enforce provisions of Air (Prevention and control of Pollution) Act, 1981.

(iii) Preparation of Comprehensive Industry Document

In 1978, CPCB initiated the process to evolve industry specific Minimal National Standards (MINAS) and policies to control water pollution from the industrial sources.

After preparation of a comprehensive document, MINAS evolved were placed before the Peer and Core Committee which comprised Chairman CPCB, experts, representatives from the Industry, representatives from Bureau of Indian Standard and National Institute of Occupational Health. The Committee recommended the standards developed for the respective industry for approval of CPCB. After approval of CPCB, the standards were sent to the Ministry for approval and notification in the Gazette.

During 1985-92, expenditure incurred under this programme was Rs 147.92 lakhs against the allocation of Rs 136.70 lakhs. CPCB had prepared comprehensive documents on 16 types of industries and had evolved 17 effluent/emission standards though this work fell in the jurisdiction of the State Boards. But, even after completion, the following documents had not been notified/published (November 1992):

Document on	Date of completion of study	Present status of the document
National standards for quality of soils for various purposes and areas	1991	Under review
Soda Ash	1989	Under finalisation
Natural Rubber Industry	1989-90	Under print
Dairy Industry	1991	Finalised for printing
Glass and Ceramics	1989-90	Finalised for printing
Acids and Alkalies	1989-90	Under preparation

Stone crushing	1990-91	Under preparation
Bullion refining	1990-91	Under preparation
Food and Fruit Processing	1989-90	Finalised for printing

For preparation of industry document time taken ranged from eighteen months to two years. Besides, the time lag between completion of a project and final printing of a document was one to two years.

Further, it was observed that CPCB brought out 30 publications (25230 copies) of Comprehensive Industry Documents (COINDS) out of which 3234 copies were sold, 3867 copies were issued as complimentary and 18129 copies were lying in the stores. This was indicative of inadequate assessment of the requirement of these publications. Further, availability of the documents was also not adequately publicised to the environmental agencies as well as general public. This resulted in CPCB not succeeding in disseminating information as envisaged in the Acts and the publications with sale price of Rs 9.81 lakhs lying unsold. Besides, due to poor circulation of the documents, feed back from end users, which would be essential in updating the standards, were also not being received.

Thirteen projects relating to preparation of COINDS were got done through outside agencies (consultants). A sum of Rs 34.80 lakhs had been released as consultancy fees. These projects were given to consultants with prior approval of the Ministry on the grounds of either inadequate expertise available with CPCB or time constraints. Though these projects were scheduled to be completed within 7 to 13 months, five of these projects were in progress for more than two years. The task of preparation of COINDS initially earmarked for the Sixth Plan period continued even in the Eighth Plan period.

4.1.8 Water quality monitoring

(i) By the end of the Sixth Plan, CPCB had established 120 water quality monitoring stations which monitored quality of water every month with reference to 19 significant

parameters subsequently enlarged to twenty two. Eighteen out of these 120 stations installed with funding from the Ganga Project Directorate (GPD) were operated by State Boards and after examining the suitability, based on proposals from the State Boards, new stations are sanctioned by CPCB. The monitoring data are sent to CPCB and the State Boards are paid at a prescribed rate for each sample depending on the number of parameters.

During the Seventh plan, Rs 154.10 lakhs was allocated out of which Rs 123.16 lakhs had been expended. Subsequently, during 1990-92, the activity shifted to non-plan and expenditure of Rs 47.39 lakhs in 1990-91 and Rs 43.19 lakhs in 1991-92 was incurred on operation and maintenance of the stations.

Of the total 480 stations established upto March 1992, 42 could not supply any data and remained non-operational for periods ranging from one to five years. The State Boards were not responsive to the request either to activate or to relocate these stations indicating lack of co-ordination between CPCB and the State Boards. CPCB also did not exercise its powers to give directions under Section 18 of the Act of 1974.

Under the Global Environment Monitoring Scheme (GEMS) of the united Nations Organisation (UNO), CPCB was required to furnish annual report on water quality data to UNO through Canada centre for inland water. CPCB sent the first report relating to the period 1985 to 1987 only in 1990. The report beyond this period had not been prepared so far (November 1992).

(ii) Biological monitoring of river Yamuna

A Memorandum of Understanding (MOU) on Environmental Cooperation was signed in January 1988 between the Government of India and the Government of Netherlands under which a project proposal entitled 'Biological monitoring and ecotoxicological studies of River Yamuna' was prepared for carrying out a pilot study on the practicability of using biological parameters to evaluate the ecological quality of fresh water rivers in India. As per MOU, contribution of the Indian Government would be Rs 43.28 lakhs and the Netherlands Government was to provide Rs 950 lakhs in the form of expert assistance, equipment and consultancy etc for the total duration of the project. River Yamuna was identified for such study because of

proximity with the office and the laboratory of CPCB and because it showed a large variation of pollution over a stretch of approximately 250 kms between a point upstream of Delhi to a point downstream of Agra. Primary objective of the project was to develop a biomonitoring methodology to assess pollution load and to generate biological and chemical data on ecological systems in order to properly manage the rivers. The work was to be carried out in two phases jointly by CPCB and Industrial Toxicological Research Centre (ITRC), Lucknow. Programme for the first year was to develop, adopt and test methodology which would give information for constructing an adequate scheme for the second phase for definite data generation.

In the mid term evaluation report, submitted by a team of the Government of Netherlands in February 1990, total expenditure in the first year (inclusive of ITRC expenditure) was shown as Rs 8.13 lakhs, out of which Rs 6.25 lakhs had been incurred on manpower. However, this did not include Rs 8.15 lakhs which was shown, in the statement of accounts of CPCB, to have been incurred towards purchase of vehicle, computer and library books. The evaluation report further disclosed that the work plan was not completely carried out as projected and due to the laboratory and manpower constraints, toxicity studies by CPCB could not be completed. The segment of technical programme to be executed by ITRC was complementary to CPCB programme without which no definite conclusion could be drawn. The absence of any report from ITRC defeated the purpose of the project. It was recommended that either ITRC should be pursued to carry out the work or CPCB should do it by adding more manpower and infrastructural facilities.

Further midterm evaluation conducted in November 1990 pointed out that the main objective of creating early warning system and bioaccumulation monitoring had not been covered. The input of manpower from CPCB was only 50 **per cent** of the commitment, which had hampered the progress to a great extent. The evaluation report also criticised (November 1990) CPCB for not defining contractual obligations of ITRC. The project was carried out without setting the strategy and was reduced to transfer of technology relevant to developed countries wihout taking into account the ground realities. CPCB had also failed to secure full involvement of ITRC.

The Ministry stated (November 1992) that the final outcome of the project was in the form of a well defined, scientifically sound yardstick consisting of eight different indices. This yardstick was extensively discussed with international and Indian experts. The yardstick was generally accepted by all the experts and users. The Ministry's reply was at variance with the earlier evaluation report and was silent about non-achievement of objectives of the project because of lack of coordination between CPCB and ITRC.

(iii) Installation of automatic water quality monitoring and sampling stations

Another part of the above mentioned collaborative programme was to install two water quality monitoring and sampling stations on river Yamuna, in Delhi, at Wazirabad (upstream) and Okhla (downstream) barrage. The principal aim and long-term objective of the project was to obtain a continuous insight into the basic parameters of the intake of water from Yamuna river for drinking purpose. The short term objectives were to:

- support the Indo-Dutch Biomonitoring pilot study to be carried out on the river Yamuna;
- gain experience with regard to the functioning of the automatic water quality monitoring and sampling stations (AWQMS);
- establish a link between manual and automatic monitoring of water quality and
- obtain information for setting up and verification of water quality models.

The project was to be carried out over a period of two years, after which final evaluation was to be conducted. The Government of Netherlands agreed to provide Rs 144 lakhs in the form of two automatic water quality monitoring and sampling stations, training and consultancy. The Government of India was to make available, through CPCB, all necessary funds for land acquisition and land preparation, staffing, costs of operation and maintenance of the two stations and import duties, if required.

The stations were received and installed during August 1991. While the Wazirabad station functioned satisfactorily, the extremely bad quality of water (sewerage) was destructive to some of the measuring electrodes of the station at Okhla besides being a health hazard to the operators. This station, therefore, had to be closed. CPCB requested the Municipal Corporation of Delhi (MCD), in November 1991, to provide a new site at Haiderpur for installation of the monitoring station and making available infrastructural facilities like platform, electrical connection etc. MCD had agreed to the proposal to make available the required facilities. The station was still to be shifted (November 1992).

CPCB stated (August 1992) that it was the first experimental project and there had been technical difficulties in making the systems operational. It was further stated that neither the experts from Netherlands nor CPCB could realise that at Okhla the water was so bad as to corrode the equipment and that the systems were highly complicated and teething troubles were inevitable. Evidently the equipment were not compatible with the site condition. The Ministry stated (November 1992) that the Okhla station has been shifted to Haiderpur (upstream) Water Works on experimental basis to monitor the water quality at intake point.

The replies are indicative of the inadequate precommissioning survey in selection of site which resulted in not only delaying the programme but also in infructuous expenditure on construction of platform (Rs 0.38 lakh) and their maintenance (Rs 1.50 lakhs). Besides, the initial positioning of two stations at Wazirabad and Okhla was to assess the quality of water entering into and going out from the city of Delhi and to assess the pollution load thus generated . Now with both the stations situated upstream, the pollution load generated by the city will remain unmonitored.

(iv) Automatic Water Quality Monitoring Stations on Ganga

To monitor water quality of river Ganga continuously, nine Automatic Water Quality Monitoring Stations (AWQMS) on the river were proposed in 1987 as a research project of CPCB. The stations were to be installed at Kannauj (one), Kanpur (two), Allahabad (three), Varanasi (one), Patna (one) and Calcutta (one) which were identified as hot spots.

Ganga Project Directorate provided Rs 50.46 lakhs (March 1990) for the programme including installation of the proposed automatic monitoring stations. Monitoring involved installation of in-situ probe system on a floating platform to measure and record water quality parameters like dissolved Oxygen temperature, conductivity, turbidity etc. Data produced was to be captured in solid State data loggers and provision was to be kept to down load data into a micro-computer. Programme for down loading the data was to be prepared by Thames Water International by October 1992. The second part of this project was to procure floating platforms on which the automatic water quality monitoring systems were to be installed.

On the basis of global tenders, order for supply, erection and commissioning of the nine automatic monitoring stations was placed, in October 1988, at a total cost of Rs 72.09 lakhs and order for procurement of nine floating platforms was subsequently placed, in February 1991, at a cost of Rs 39.18 lakhs.

According to the contract, the firm had to submit design and detailed drawings of the stations within two months from the date of the order. The firm was to be informed of the locations within five months and all nine stations were to be installed and commissioned within 240 days of the date of order. The contract also provided for levy of liquidated damages in case of delays in performance with the right of rescission in the event of delays in delivery.

An advance of Rs 7.21 lakhs being ten per cent of the total contract value was paid to the supplier in two instalments in February and September 1989. The programme which was to be completed by June 1989 has not yet (January 1993) been completed.

One set out of four to be supplied within six months, was tested at Wazirabad Water works on River Yamuna for four months, from December 1990 to March 1991, by a team of experts from UK who were satisfied with its performance. Each of the remaining three systems of the first lot were also tested during May 1991 at the premises of the supplier at Madras continuously for 24 hours. All three systems performed satisfactorily. Delivery of all the four systems were proposed subject to recommendation of the expert team which was to be received through GPD. The systems were once again tested in May 1991 and printout of the monitoring data supplied to CPCB without

turbidity measurements. These were not done due to some discrepancy in the turbidity measurement systems and as CPCB had noticed a lot of discrepancy in the turbidity measurements for Wazirabad Water works tests. However, the first lot of four systems were received and installed at the stations between August 1991 and February 1992.

Two stations at Kanpur became non-operational within a couple of weeks after installation without generating satisfactory data. CPCB reported this matter to the supplier in February 1992 and instructed them to import the equipment required for the remaining five units, so as to avoid delay in supply and installation of the stations, but without any obligation on CPCB to accept the remaining five units if the performance of the first four units was not satisfactory.

CPCB released Rs 30.95 lakhs to the supplier towards supply of four sets of stations on pro-rata basis, in August 1991 (for one set) and in December 1991 (for three sets) notwithstanding unsatisfactory working of the system.

The supplier was also asked to provide continuous and uncorrupted data for one month from each of the stations. It was also decided that the order for supply of the remaining stations would be placed only after satisfactory performance of the system. Two sets of data for the period 4th February 1992 to 16th March 1992 and 25th March 1992 to 7th April 1992 received from Kanpur station were not found to be reliable. The firm attributed the discrepancy to insufficient water depth. CPCB decided to shift the stations to alternative sites in order to obtain reliable data on the basis of 20 days operation by the first week of July 1992. Further progress in this regard was not made available to Audit though asked for.

Besides the expenditure amounting to Rs 38.16 lakhs on the system, Rs 28.73 lakhs was spent on procurement, fabrication and commissioning of floating platform for use of the system. Four platforms were supplied and erected and the fifth one was lying in the manufacturer's premises for want of the system.

Thus, the expenditure of Rs 66.89 lakhs on the system and the platforms were yet to yield any benefit.

The Ministry accepted the facts (November 1992) and expected that the system would prove its worthiness and the objectives would be met in due course.

(v) River Basin Studies

The objective of the River Basin Studies was to ascertain quality of a river consistent with human activities in the river basin and to inter relate the activities and quality so as to identify the cause of pollution qualitatively and quantitatively and prepare an Action Plan to control pollution and maintain or restore the wholesomeness of river.

The studies included classification and zoning of rivers at various reaches and ascertaining pollution potential in the river basin. It also consisted of both wet and dry study. The wet study involved monitoring of river water quality for specific period and the dry study involved field study on the basin activities. The studies were carried out through the State Boards with CPCB's financial assistance. With the help of the data generated, basin and sub-basin reports were prepared by CPCB.

For these studies, CPCB had identified 15 major river basins of the country covering over 20,000 sq kms of catchment area. Out of the 15 studies, three were completed and printed during the Seventh plan period and three had been published before that. The remaining nine were to be completed and published by November 1988 to December 1991. However, only three studies have been completed and are yet to be published, report in respect of one study is under preparation, two studies are under progress and action is yet to be initiated in respect of the remaining three studies. Revised target dates for completion and publication have not been set and expenditure incurred on these studies not made available.

On the basis of the river basin studies, Action Plans for abatement of river water pollution are prepared on 'Best Use Concept' basis for different rivers. In the annual action plan of CPCB for 1990-91, preparation for Action Plans for five major rivers was to be taken up. However, CPCB stated in January 1993 that Yamuna Action Plan had been prepared and Damodar and Sabarmati Action Plans would be completed during 1993-94.

The Ministry stated (November 1992) that Action Plan for 37 polluted river stretches under National River Action Programme of GPD, utilising the data of CPCB on river water quality monitoring, was under preparation.

4.1.9 Air Quality Monitoring

(i) National Ambient Air Quality Monitoring (NAAQM) Stations

To improve quality of air and to prevent, control or abate air pollution in the country, knowledge of air quality status was a pre-requisite. In 1984, National Ambient Air Quality Monitoring (NAAQM) was initiated by CPCB which identified three parameters for monitoring, namely sulphur dioxide, nitrogen dioxide and suspended particulate matter. Monitoring for sulphur dioxide and nitrogen dioxide was to be conducted at four hourly intervals and for suspended particulate matter at eight hourly intervals on two days every week basis as far as possible. CPCB was to scrutinise and analyse the data according to its proposed ambient air quality standards and prepare corresponding interpretative reports. These reports would not only assist in identifying air polluting cities/towns but would also be useful in pollution management programme.

For establishment of NAAQM stations, CPCB had incurred an expenditure of Rs 261.63 lakhs during the Seventh Plan period (1985-90) and Rs 176.45 lakhs during the years 1990-91 and 1991-92 out of its annual plans. By March 1992, CPCB had established 290 stations in the country. Out of these only 217 were in operation and sending data regularly and remaining 73 stations were not in operation even after one to eight years of their setting up. Thus, a sum of Rs 27.30 lakhs released to the State Boards for the non-working stations remained unfruitful.

The first report 'National Ambient Air Quality Statistics of India' was prepared during 1990 after an attempt to systematically process data generated during 1987 to 1989. The detailed interpretative report which was to be prepared separately had not been prepared so far (August 1992).

In December 1990, another report named 'Ambient Air Quality Status of some cities/towns in India' was also prepared. This report for each State consisted of information pertaining to the cities/towns covered under

NAAQM programme. In May 1991, a report of monitoring on 'National Ambient Air Quality Statistics of India 1990' was prepared. Target frequency of monitoring prescribed by CPCB was not followed in all these reports which was attributed to diverse locations of data gathering with varied laboratory practices and personal bias.

Though it was repeatedly being mentioned in the reports that frequency of prescribed time limit was not being adhered to by the stations, CPCB did not take any steps to initiate any remedial action to obtain appropriate data from all stations uniformly. CPCB had not devised any mechanism for regular inspection of the stations.

In February 1992, CPCB requested all the State Boards not to start any new stations in the next financial year and also to cut down expenditure by reducing monitoring activity from three days in a week to two days in a week with 24 hours monitoring on each day with effect from March 1992. It was also decided that air monitoring stations which were sanctioned prior to March 1990 but could not be started till date need not be pursued and the amount paid to the State Boards be refunded to CPCB. Despite this decision in February 1992, no effort was made so far (November 1992) to get refund of Rs 27.30 lakhs from the concerned State Boards for the non-operational stations.

Thus, National Ambient Air Quality Statistics of India remained at the data collection stage only and no interpretative report based on the data could be produced till date (November 1992). Out of the 1100 copies of the publications printed at a cost of Rs 0.50 lakh (approx), few copies were sold which showed poor public response. CPCB so far could only initiate preliminary work on air quality improvement in the country and follow up action towards prevention, control and abatement of air pollution is yet to be initiated. No perspective plan has been framed so far (January 1993). The Ministry stated (November 1992) that analytical quality control exercises are to be gradually expanded to cover the entire NAAQM network as a routine exercise.

(ii) Air Quality Monitoring by National Environmental Engineering Research Institute (NEERI)

NEERI, an institute under Council of Scientific and Industrial Research (CSIR), was involved since 1977-78 in

air quality monitoring in ten cities for an initial period of ten years.

CPCB agreed (November 1989) to collaborate with NEERI, at the latter's request (May 1988), for monitoring of certain sophisticated parameters in air through NEERI's existing network of air quality monitoring stations located in ten metropolitan cities. As these stations were already in existence supported by laboratory facilities, only operation and maintenance cost of stations was to be borne by CPCB.

In November 1989, a proposal for monitoring six parameters in addition to the routine parameters like Sulphur dioxide, Nitrogen dioxide and Suspended particulate matter (SO_2, NO_2 and SPM) was agreed to for a total cost of Rs 7.10 lakhs for 30 stations (i.e Rs 0.71 lakh per city for a period of six months from October 1989 to March 1990). A sum of Rs 7.73 lakhs (revised) was released to NEERI in January 1990.

In July 1990, first data from NEERI (NAAQM) stations were received and following observations made:

- The data was reported only for six instead of 10 cities.
- Out of the six cities some stations started functioning in December 1989 and some in January and February 1990.
- Results of particle size distribution in the ambient air had not been reported.
- Four metereological data had not been reported.

This was brought to the notice of NEERI in August 1990. Upto February 1991 no data was received from any station. An inspection of the three NEERI operated stations located in Kanpur revealed inter alia that though monitoring of hydro carbons, heavy metals, H_2S, NH_3 and particulate matter was being conducted by the stations, results of these parameters were not being provided to CPCB.

Upto August 1991, NEERI was not monitoring according to the parameters agreed upon and CPCB felt the necessity of

withdrawing the project from NEERI in case it failed to monitor the special parameters from October 1991. However, despite non-monitoring of these parameters, Rs 14.53 lakhs was also sanctioned in March 1992 without receiving further reports, details of expenditure including the expenditure incurred towards purchase of chemicals and glassware etc, mainly to avoid lapse of funds.

The data furnished by NEERI was also not incorporated in any of the statistical reports prepared so far (August 1992). All the NEERI stations were in the cities where the State Boards were also conducting monitoring of routine parameters i.e. SO2, NO2 and SPM. As NEERI was not sending any data for special/sophisticated parameters the work being conducted by the NEERI stations was a replication of the State Boards' activities, which amounted to a redundant expenditure of Rs 22.26 lakhs.

(iii) Air quality monitoring in metropolitan cities

European Economic Community (EEC) signed a Marginal Cost Sharing Contract in July 1985 with CPCB for a research project titled 'Air Pollution Monitoring in relation to human health in metropolitan cities in India' for an estimated cost of 383600 ECU (European Currency Units) equivalent to Rs 35.98 lakhs.

During the project period, two continuous multiparameter monitoring stations were to be procured and installed to assess the level of atmospheric pollutants . The whole project was proposed for a duration of three and half years and the technical programme was to be conducted in three phases viz planning and installation, collection of data and data processing and evaluation. Practical utility of the project was to study epidemiological factors responsible for some common chronic diseases in the areas which could provide the scientific basis for health status of such population.

The initially proposed project cost was enhanced to 925,600 ECU (Rs 86.82 lakhs) in November 1986 and the total number of multiparameters measuring stations was also increased from two to five. Later, in January 1988, cost of the project was reduced to 650,000 ECU (Rs 60.97 lakhs) and the multiparameters measuring stations was also reduced to three.CPCB decided to install two stations in Delhi at Siri Fort and Shahadara and the third at Calcutta.

Three stations were received in CPCB during August 1988, one of which was found damaged and declared unfit for installation. One station at Calcutta could not, therefore, be installed. CPCB stated (May 1992) that the supplier at the time of despatch replaced the single phase uninterrupted power supply (UPS) system to three phase UPS system without intimating them.

The stations at Siri Fort and Shahdara, even after installation in September 1988, could not be put into operation due to non availability of three phase power supply. The contractor who was to install the stations also did not turn up till November 1989. The stations were put into operation in February 1990. But, these continued to face software problems and data collected could not be utilised. Experts from EEC visited India in February and July 1990 to sort out the problems identified with the system.

Due to power shortage, CPCB decided to shift the Shahdara station in April 1991. The station at a new place is yet to be commissioned.

It was evident from the above that the project was neither run on schedule nor the purpose of installation of the stations could be served due to communication gap between EEC , the supplier and the end user which resulted in the equipment proposed and provided for not matching the requirements.

The Ministry stated (November 1992) that drawings etc had been prepared for construction of the damaged station lying in CPCB premises for which the work was yet to start.

(iv) Health status of population around Air Quality Monitoring Stations

Under the EEC bilateral project, it was also envisaged that as part of the project, health survey would be conducted around these monitoring stations which would throw light on the epidemiological factors responsible for some chronic diseases generally prevalent in the areas. This would provide scientific basis for health status of such population. Administrative approval to conduct health survey in three locations under this project for a total cost of Rs 2.64 lakhs was accorded in

January 1988 with project duration from December 1988 to March 1990. The study was started from May 1989.

As per memorandum of understanding (MOU) between CPCB and All India Institute of Medical Sciences (AIIMS), survey of health status of the people staying nearby two automatic air monitoring stations (Siri Fort and Shahdara) was to be conducted by a professor of AIIMS from the date of issue of sanction.

The Ist and 2nd phase reports, which envisaged survey for general health and isolation of persons with disorders, were submitted together by AIIMS in October 1990. However, the project coordinator (CPCB) was not satisfied and felt that there was no correlation between air quality data (collected by CPCB) and health data (collected by AIIMS) because of non functioning of the monitoring stations.

It was also noticed that the survey conducted at Siri Fort area was for lesser numbers than that conducted at Shahdara area. Further, it was pointed out that there was no proper mention about disease pattern surveyed due to ambient air pollution or due to socio-economic conditions and the death history of persons was not indicative of whether death occurred due to infectious diseases, cancer or cardiovascular disease etc. The aspects of mental status of a person were also not covered under this survey of both the locations.

AIIMS filed a supplementary report for phases I and II and stated that it was very difficult at that juncture to point out the specific problems attributed by the air pollutants; hence no definite measure of protection against those diseases could be planned. It was also suggested in that report that a regular detection of ambient air pollutants and pathogens and their exact correlation with disease pattern was necessary. CPCB extended the programme upto September 1991 at the request of AIIMS without any further cost.

No action had been taken (January 1993) on the report on the project prepared by AIIMS and received in CPCB in April 1992.

The project which was to establish causes for general health problems of the urban population on the basis of air pollution data did not succeed as the monitoring

station could not be established in time. The expenditure of Rs 3.67 lakhs did not yield any benefit.

4.1.10 Monitoring of Indian Coastal Water

(i) In the Expenditure Review meeting held in August 1985, the Ministry desired CPCB to initiate action on prevention of coastal pollution. CPCB was asked to prepare a plan of action for approval prior to preparation of the project proposal. The various State Boards of the coastal States were requested to forward project proposals (for coastal monitoring) to CPCB to enable formulation of an integrated system of monitoring along 6000 kms of the coast line.

A project named 'Monitoring of Indian Coastal Waters' was approved by the Ministry and sanction for Rs 108 lakhs was conveyed in February 1987. The proposal was to establish a monitoring net-work covering the critical stretches as already identified in the coastal survey conducted by CPCB. Justification for the proposal was that three out of four largest metropolitan cities with increasing population were situated on the coast and a sizeable population was dependent on fishing and marine activities near the shore. Also, if the resources that were available at the interface of land and water were to be utilised on a sustainable basis, action had to be initiated to understand the physio-chemical and biological characteristics of coastal waters and the implications of indiscriminate exploitation of nature.

The project was designed for a period of three and a half years initially. Nine agencies viz the State Boards of Gujarat, Maharashtra, Karnataka, Kerala and Andhra Pradesh, Zoological Survey of India, Madras and the sectional/regional offices of CPCB located in Goa, Pondicherry and Calcutta were identified as the executing agencies. National Institute of Oceanography (NIO), Goa was to act as an advisory body for this programme and for overall co-ordination. Department of Ocean Development (DOD) and CPCB were the nodal agencies. Each executing agency had to send quarterly monitoring data and half yearly and annual reports to CPCB, NIO and DOD to get further directions/feed back for effective data collection, compilation and presentation. The final reports of the complete monitoring of specific stretches were to be supplied by September 1989 so that a concise report of the State of Indian coast line would be

prepared by both CPCB and NIO, after necessary processing which was to be ready by end of December 1989.

Under this project a network of 173 inland, coastal, off-shore and high-sea monitoring stations were established to be monitored by the respective State Boards. The zonal office of CPCB at Calcutta was, however, entrusted with monitoring of the 24 stations in Orissa and West Bengal.

As per project document, the sampling had to be done once in three months for the coastal areas. In case of estuaries, sampling was to be done once in two months if the opening was shallow and one full tidal cycle of 13 hours had to be covered for a flood channel or effluent channel. Each station had to monitor the coastal water for 24 specified parameters.

There were delays in communicating the data to CPCB/NIO as under:

Name of Agency	Data not communicated
Gujarat Board	April 1990 onwards i.e. II, III and IV rounds of 1991 and Ist round of 1992.
Maharashtra Board	From October 1991 onwards i.e. IV round of 1991 and Ist round of 1992.
Kerala Board	From January 1992 onwards.
Tamil Nadu Board	From April 1990 onwards.
Zonal office, Calcutta	From April 1991 onwards i.e. II, III, IV rounds in 1991 and Ist round of 1992

It was noticed that monitoring by the Tamil Nadu Board was inadequate. Data collected from the monitoring network were also not being communicated to CPCB/NIO in time. Meaningful analysis was not possible for incorporation in the report.

Against the sanctioned amount of Rs 108 lakhs, the Ministry released Rs 115 lakhs upto March 1992 without modifying the original sanction issued in February 1987. Further, out of Rs 115 lakhs received, CPCB had distributed only a sum of Rs 88.36 lakhs to the executing

agencies. Payment for 1991-92 was not released to the executing agencies because bills for that year had not been submitted. CPCB also did not obtain utilisation certificates, as under, for the funds released to the executing agencies:

Name of the Agency	Utilisation certificate outstanding since
Tamil Nadu Board	1987-88
Zonal Office, Calcutta	1988-89
Kerala Board	1990-91
Gujarat Board	1990-91
Maharashtra Board	1991-92

The project which was initially to be completed by 1990 had been extended till March 1992 reportedly due to bad weather conditions, high cost on hiring of vessels and inadequate funds etc. The Ministry decided not to continue with the programme after April 1992 due to financial constraints.

The project thus failed to bear any result even after six years. Even though CPCB Zonal office, Calcutta had made large contribution, the Coastal Water Quality map had not been prepared so far (August 1992). The 'Concise report of the State of Indian Coast line' also remained to be prepared (August 1992).

The Ministry stated (November 1992) that CPCB has developed a soft-ware for analysis of coastal data and the data are under analysis for preparation of report on coastal water quality.

(ii) Coastal Ocean Monitoring And Prediction System (COMAPS)

Department of Ocean Development (DOD) started a project entitled 'Survey of Environmental Pollutants in Seas around India' in 1986-87 which was mainly aimed at seasonal monitoring/measurement of pollution in Marine Coastal areas upto 5 kms off-shore along the country's entire coastline. DOD selected (July 1986) three executing agencies one of which was the Zonal Office of CPCB at Calcutta. Based on a project proposal titled 'Monitoring of Marine Pollution in Territorial Waters of India' (along the East Coast) submitted by the zonal office in March 1988, DOD sanctioned the project and conveyed approval of Rs 15.88 lakhs, including Rs 12

lakhs for equipment, in January 1989. Duration of the project was, however, not mentioned in the sanction of DOD.

The main objectives of the project were to initiate and conduct a systematic monitoring of the territorial waters of the east coast beyond 5 kms off-shore, after establishing a permanent marine pollution monitoring station with adequate capabilities of field and laboratory works,

The monitoring was to be carried out at regular intervals and in terms of selected water quality parameters to determine nature and extent of pollution. In December 1989, DOD decided to establish its Centre for Marine Environmental Studies at NIO Regional Centre Bombay. The Zonal Office, CPCB, Calcutta was one of the units among the eleven units identified for undertaking the work on Marine Pollution Monitoring and Modelling of pathway and fluxes of exotic chemical elements into sediments, biological systems and the seas. These eleven units were to carry out monitoring activities according to a specified protocol. DOD released a total grant of Rs 21.60 lakhs (excluding for manpower) in March 1989 and July 1990 for all the above mentioned activities.

The Steering Committee of DOD reviewed and modified the project in June 1990 and redefined the length and width of study stretches. The width of stretch was also increased to 25 kms off shore instead of that from 5 kms to 22.5 kms off-shore and renamed it as "Coastal Monitoring and prediction system (COMAPS)".

Out of 29 laboratory equipment, Zonal Office, CPCB, Calcutta could procure only one equipment 'Backman Liquid Scintillation Counter' costing Rs 5.36 lakhs upto April 1991 which was still awaiting commissioning (August 1992) due to non-availability of certificate from Bhabha Atomic Research Centre (BARC).

As per Utilisation Certificate for the period upto March 1992, Rs 4.04 lakhs had been spent on equipment in excess of the funds received for that purpose under the project.

4.1.11 Listing of pollution sources

CPCB had prepared an industry inventory in 1984 to assess pollution status in major and medium polluting industries. During the Seventh Plan period the status

reports on Class I and Class II cities were also prepared. With rapid industrial development, CPCB felt it essential to update the inventory every five years. Further, the earlier inventory prepared in 1984 did not have information on the quantum of pollutants released by the industries, which was essential for identification of hot spots in the country. Also, with introduction of Air Act 1981, a similar inventory for air polluting industries had become essential.

In June 1987, a reorganisation plan was prepared under which CPCB was to complete, by 1990, inventorisation of all major and medium industries for air and water pollution, upgradation of sanitation State in Class I and class II cities and status of vehicular pollution in metropolitan cities.

So far (August 1992) CPCB could neither update the inventory nor make complete listing of all major, medium and small scale industries which were relevant to air and water pollution due to lack of response and timely supply of information from the State Boards.

The Ministry stated (November 1992) that CPCB had decided to entrust the work with Central Statistical Organisation as the infrastructure available with CPCB was not adequate to collect the information.

4.1.12 Laboratory development - mobile laboratories

CPCB had six zonal offices at Calcutta, Baroda, Shillong, Kanpur, Chandigarh and Bangalore. Mobile laboratories for surveillance, planning and control of pollution were already provided at Calcutta, Baroda and Kanpur. For mobile laboratories at the remaining zonal offices at Bangalore, Chandigarh and Shillong, three chassis were received in June 1990 at a cost of Rs 8.90 lakhs. Subsequently, two chassis were proposed to be used for remounting the GTZ Automatic Air Quality Monitoring Systems (AAQMS) since the chassis on which these were now mounted were not able to take the load, and the third one was proposed to be given to the Rajasthan Board. All the three chassis however are still lying idle (November 1992).

The cost of equipment already procured for the mobile laboratories (excluding the chassis) worked out to Rs 16.13 lakhs.

Thus, the monitoring and survey activities remained static even after an expenditure of Rs 25.03 lakhs. CPCB stated (August 1992) that the (unmounted) equipment were in use in the stationary laboratory at the headquarters and there were some constraints but the work schedule of CPCB was usually not hampered. The statement is not tenable as the equipment and the chassis were procured for mobile laboratories and not for use at headquarters. It was also stated by CPCB that two chassis would be utilised for AAQMS and one would be donated to the State Board which requested for it alongwith their detailed plan for fabricating the same. Obviously, the expenditure was incurred without proper assessment of the need and preparation for use of the chassis and the laboratory equipment.

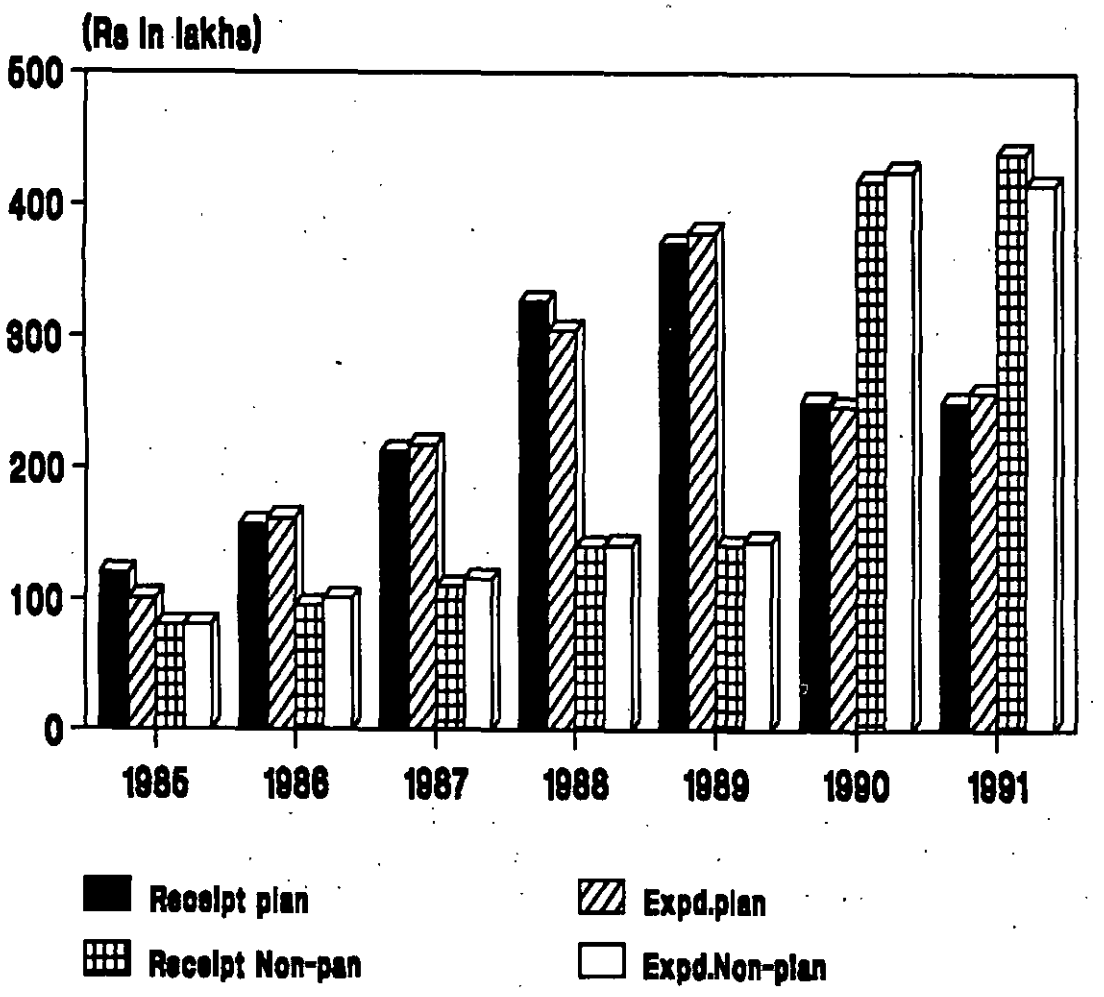
4.1.13 Finance and Accounts

CPCB was fully funded by the Ministry. Grants received and expenditure incurred during the period 1985-92 were as shown below:

Year	Grants received under Plan	Expenditure incurred under Plan	Grants received under Non-plan	Expenditure incurred under Non-plan
		(Rs in lakhs)		
1985-86	120.00	101.05	80.38	80.80
1986-87	157.00	161.47	95.00	100.52
1987-88	212.00	217.13	110.00	115.40
1988-89	326.50	304.32	140.00	141.11
1989-90	370.00	379.04	141.90	143.87
1990-91	250.00	246.89	418.00	425.20
1991-92	250.00	257.70	439.00	415.18

In their report, the statutory auditors pointed out, in September 1986 and August 1988, that the accounts of CPCB did not reflect the undermentioned transactions:

Receipt & Expenditure under Plan and Non-plan



Brief particulars	Amount involved (Rs in lakhs)	Year of account	Exhibition in the accounts
Funds received from European Economic Community (EEC)	28.40	1985-86	Not exhibited in accounts; the amount returned to EEC during January 1987 and June 1988.
Payments of equity capital to Tamil Nadu Leather Development Corporation (TALCO)	10.00	1985-86	Not exhibited in any of the accounts

CPCB had received equipment and instruments valued at Rs 4819.43 lakhs from foreign countries under international collaborative projects. However, value of such assets was not being exhibited and included in the annual accounts and to that extent the accounts did not reveal complete status of the assets. Further, there was no supporting asset register for the assets worth Rs 530.44 lakhs, excluding depreciation, reflected in the annual accounts of 1990-91. CPCB stated that no such asset register was being maintained.

The statutory auditors in their report of November 1991 had commented that the procedure for physical verification of assets was not adequate. No action was taken on this report.

Though CPCB has spent substantial amount on acquisition of equipment, sound procedure for accounting and custody of stores was not being followed.

Diversion of funds

Ganga Project Directorate (GPD) provided CPCB Rs 209.20 lakhs for monitoring of Ganga Water under Ganga Action Plan. CPCB was required to utilise the funds for use in establishment of automatic water quality monitoring stations on river Ganga and pending requirement the amount was to be kept in an interest bearing account. During 1990-91 and 1991-92, CPCB utilised an amount of Rs 60 lakhs for other purposes. CPCB did not also invest the

funds in short term deposit through which interest to an extent of Rs 6.05 lakhs could have been earned. This was not only a diversion of funds but also a loss to the project. CPCB at the close of 1991-92 had an unutilised balance of Rs 46.23 lakhs.

4.1.14 Materials management

Improper maintenance of records

CPCB had not manualised the procedure in respect of acquisition, custody and accountal of stores articles. The procedures prescribed in General Financial Rules (GFR) were stated to be followed in this regard. No consolidated records were maintained for receipt and issues of dead stock and other stores, which was in contravention to Rule 112 of GFR. Purchases made for the Zonal/Sectional offices were also issued without keeping any record. No separate assets/dead stock registers were maintained at headquarters in respect of Zonal/Sectional offices. CPCB was also not aware of the assets created out of grants received through sponsored/collaborative projects.

Extra outflow of foreign exchange

Under the financial rules, all contracts for purchases involving import of materials from abroad should as a rule provide for purchases on FOB basis and full consideration should be given by the competent authority to the element of foreign exchange involved therein and least expenditure on foreign exchange should be preferred. It was, however, observed from the purchase cases that equipment/instruments had been imported on CIF basis thus resulting in avoidable outflow of foreign exchange. A test check of import cases revealed that the foreign exchange outflow on this account amounted to Rs 3.39 lakhs. CPCB accepted the facts (May 1992).

Transfer of assets and disposal

It was observed that CPCB had transferred assets created out of Government grants to the various State Boards without permission from the Government of India which was irregular since the assets belonged to the latter at the time of closure of its Zonal and Sectional Offices in the respective States. Recently assets worth Rs 6.11 lakhs

and Rs 4.43 lakhs were handed over to the State/UT Boards from the zonal office at Chandigarh and Pondicherry.

Equipment lying out of order

Equipment worth Rs 19.95 lakhs were lying out of order since 1989. In two cases involving Rs 4.44 lakhs these were still under their guarantee period but no action had been taken to get them replaced/repaired.

4.1.15 Execution of works

CPCB was allotted in April 1983 a piece of land measuring 1.51 hectares by Delhi Development Authority (DDA) at Shahdara, Delhi for its building at a cost of Rs 22.38 lakhs. The Ministry accorded expenditure sanction for Rs 3.28 crores for construction of building complex during December 1986 and July 1988. CPCB, however, spent Rs 3.57 crores on the work. The excess expenditure was yet to be regularised.

Award of original work could not be examined in the absence of comparative statements of evaluation of tenders.

Construction of the main building was completed in January 1990. The process of shifting of the office to the new complex commenced from September 1989. The contractor was allowed initially a period of two years (August 1986 to August 1988) for completion of the job. However, extensions of over 17 months was granted without levy of compensation. The contractor desired the extension on the following grounds :

(i) Change in the scope of work,
(ii) Delay in sanctioning additional work and
(iii) Delay in decision relating to external works.

CPCB accepted the hindrances as explained by the contractor. Escalation paid to the contractor for the period of delay amounted to Rs 19.48 lakhs.

CPCB in its judgement deleted certain items of work from the scope of the job which amounted to Rs 33.64 lakhs i.e. more than 10 **per cent** of the items awarded to the lowest contractor. Since CPCB was not in a position to produce the comparative statement of the original tenders evaluated for working out the rates of the lowest

tenderer, it could not be ascertained if deletion or substitution had vitiated the tendering process.

During execution, the contractor was given benefit of 12.29 MT of steel over and above the approved wastages. This quantity was said to have been consumed in rolling although no rolling was required because the steel was supplied as a finished product. Thus amounting to undue benefit of Rs 1.22 lakhs to the contractor.

CPCB had to procure two transformers for the electrical sub-station at the risk and cost of the electrical contractor. Difference between cost paid (Rs 4.54 lakhs) and tendered cost (Rs 2.58 lakhs) was recoverable from the electrical contractor. However, the Arbitrators had disallowed the claims since the correct clause was not enforced by CPCB.

CPCB also could not shift to the new premises and had to pay Rs 6.49 lakhs towards rent for the period April 1989 to August 1989.

Thus, in view of the facts stated above, CPCB had to incur additional expenditure of Rs 29.15 lakhs on account of inadequate planning, slackness in supervision and non-enforcement of contract clauses at various stages of the progress of work.

The Ministry acknowledged (November 1992) that the original comparative statement was not available and that the wrong clause had been quoted in the letter to the contractor while procuring transformers. The Ministry maintained that the contractor was allowed a rolling margin in the consumption of steel. However, it was observed in audit that steel was supplied in finished form and hence no rolling was required.

4.1.16 Library and publication

Overstocking of publications

18129 copies of 'Comprehensive Industry Documents(COINDS), priced Rs 9.81 lakhs were lying in stores. In addition, 24828 copies of various publications priced Rs 18.00 lakhs had also been lying in the store from 1978-79 to 1990-91 as indicated below:

Name of series of Publication	Quantity lying in store(nos)	Total price of publication lying in store (Rs in lakhs)
CUPS	3710	1.88
PPROBES	10069	4.14
ADSORBS	6766	10.10
COPOCS	1648	0.86
LATS	440	0.13
MINARS	2195	0.89
	24828	18.00

The Ministry stated in (November 1992) that the sale was low due to inadequate advertisement and lack of awareness among the general masses about the publications. However, in future publicity would be given in news papers to encounter such problems.

Missing library books

It was observed that 349 library books had been found missing during physical verification conducted for the year 1988-89. Cost of 243 books was Rs 1.42 lakhs and cost of remaining 96 books was not available with CPCB.

The Ministry stated (November 1992) that suitable action would be taken to trace out the missing books failing which action to write off would be initiated.

4.2 Irregular release of funds

The Ministry of Environment and Forests approved, in April 1987, installation of a Digital Cartography System at Forest Survey of India (FSI), Dehradun. A technical committee was formed to advise on technical specifications of the system suitable for Indian conditions. Based on the Technical Committee's report submitted in October 1987 it was decided that the Department of Space (DOS) would deliver, on turnkey basis, completely commissioned and efficiently functioning system to the Ministry. DOS worked out the estimated cost of Civil Works for renovating the site at Rs 73 lakhs.

In February 1990, firm "A" (a Government of India Undertaking) offered its services for computer site preparation to FSI on turnkey basis and submitted an estimate for Rs 89 lakhs. Accordingly, the Ministry conveyed expenditure sanction of Rs 31.75 lakhs on 13 March 1990. FSI executed a Memorandum of Understanding (MOU) with the firm on 26 March 1990 for execution of site work and paid Rs 31.75 lakhs in March 1990 as advance. The Civil Construction Unit (CCU) of the Ministry or the Central Public Works Department (CPWD) was neither considered nor consulted for execution of Civil Works for renovation of the site.

The MOU provided that all other payments would be in accordance with the final agreement with the firm. No agreement was, however, signed but the firm was requested to immediately start renovation work on the space made available (May 1990).

Some structural changes were considered essential for housing the system which included removal of load bearing walls and for this purpose the site design and the proposed structural changes were sent in February 1991 to CPWD, for approval. CPWD intimated FSI in May 1991 that they were not in a position to guarantee the load bearing capacity of foundation and could not, therefore, approve structural changes. It was, therefore, decided in August 1991 by the Board of Management of Natural Forest Data Management Corporation (NFDMC), the authority monitoring progress, to shift the site and house the system in the new building of FSI already under construction. It was also decided that some of the items included in the site preparation contract would be got done through the CCU of the Ministry. Though there was no progress of work (August 1991), the Ministry released, in March 1991, a further amount of Rs 41.25 lakhs and that too without entering into any agreement and without referring the renovation plans to CPWD.

In March 1992, the firm submitted bills of Rs 24.27 lakhs advanced by them to suppliers towards purchase of Diesel Generator set and Uninterrupted Power Supply. The Ministry informed (December 1992) that Rs 46.01 lakhs had been refunded by the firm and steps were being taken to recover balance Rs 2.72 lakhs. The Ministry also contended (October 1992) that advance payments were essential for carrying out the work with reference to the situation prevailing then. This plea was not tenable as

the second instalment of Rs 41.25 lakhs was released in March 1991 contrary to the provisions of the MOU and also despite there being no progress in the work. Further, the CCU of the Ministry or the CPWD could have been consulted in the initial stages itself and their technical opinion obtained before releasing even the first instalment which was done hastily. In the process there was avoidable idling of substantial amount.

4.3 Non-implementation of a scheme

Department of Environment, Forests and Wildlife took up, for implementation during the Seventh Five Year Plan, a Central Sector Scheme entitled 'Strengthening of Central Wildlife Division and Consultancies for Special Tasks'. The object of the scheme was to check illegal export and import of wild animals and articles made from skin and parts thereof. A sub-Regional Office at Guwahati was to be opened to take care of the north-eastern region with particular reference to illegal trade in rhino horns, ivory and orchids, for which staff composed of one Assistant Director, one Inspector, one Technical Assistant,one lower division clerk and one driver was sanctioned by the Department in July 1986. Appointments of Technical Assistant and lower division clerk were made in March 1989, and of driver and Assistant Director in August 1989 and March 1992 respectively. The above officials remained without work at Calcutta Office as the Sub-Regional Office at Guwahati was not opened (August 1992). The post of Inspector also remained vacant (August 1992). A Maruti Gypsy purchased in May 1989 for Rs 1.39 lakhs for the Sub-Regional Office had been lying at Calcutta since it procurement.

Thus the expenditure of Rs 2.22 lakhs on pay and allowances of officials of the proposed office (upto March 1992) became infructuous apart from idling of funds of Rs 1.39 lakhs spent on the purchase of vehicle for over three years.

The Ministry stated in February 1993 that while the scheme was being implemented from Calcutta due to non-availability of suitable accommodation at Guwahati, shifting of sub regional office to Guwahati would further improve the control in the field and efforts were being made therefor.

Thus, the purpose of checking illegal export and import of wild animals and articles made from skins and parts thereof for which the office was to be set up at Guwahati remained substantially unachieved.

4.4 Follow up on Audit Reports

The Lok Sabha Secretariate issued instructions (April 1982) to all the Ministries requesting them to furnish notes indicating remedial/corrective action taken by them to the Ministry of Finance (Department of Expenditure) on the various paragraphs contained in the Audit Reports of the Comptroller and Auditor General of India as soon as they were presented to the Parliament. Such notes were required to be submitted even for paragraphs which were not selected by the Public Accounts Committee for detailed examination.

A review of the Action Taken Note on the observations of Audit contained in the Reports for the last five year's revealed that the Ministry has not submitted (March 1993) such notes on the following paras:

Audit Report Number and Year	Para No.	Caption
1. No 2 of 1991	6	National Wasteland Development Board (Sub paras 6.7,6.8,6.10 to 6.15, 6.17 and 6.18)
2. No 2 of 1991	7	Unutilised grant-in-aid.
3. No 2 of 1992	3.2	Zoological Survey of India -audit review.

CHAPTER V

Ministry of Non-Conventional Energy Sources

5.1 Solar Energy Programme - audit review

5.1.1 Introduction

Solar Energy has emerged as the frontier area of research for meeting energy needs of our country. While the weather conditions in India are ideally suited for tapping solar energy, high cost has been a hindering factor.

Though work on development of solar appliances was started in the early fifties and the Department of Science and Technology **(DST)** also started funding research programmes in this area from 1976, the real impetus to the programme was given in 1981 with the establishment of Commission on Additional Sources of Energy **(CASE)** within DST. With the creation, in 1982, of the Department of Non-Conventional Energy Sources **(DNES)**, the programme was tranferred to this Department which is now functioning as a separate Ministry.

Solar energy programmes are looked after by two (of the nine) divisions of the Ministry, viz, Solar Photo-Voltaic **(SPV)** and Solar Thermal divisions. Besides, there are six regional offices of the Ministry entrusted, inter alia, with the Solar Energy programmes.

A Solar Energy Centre was set up at Gwalpahari, Gurgaon in 1982 to carry out prototype development, testing and demonstration activities in respect of new developments in this field.

5.1.2 Scope of audit

This review covers the activities undertaken by the Ministry for research, development and extension of Solar Energy during 1986-92. The activities of State nodal agencies, to the extent funded by Government of India, have also been examined in 12 States viz Andhra Pradesh, Bihar, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal and in the Union Territory of Pondicherry.

5.1.3 Highlights

General

- Expenditure on Solar Energy Programme constituted about 16 per cent of the expenditure of the Ministry. During 1986-92, an amount of Rs 111.41 crores was spent on this programme.

(Para 5.1.4)

Solar Photo-Voltaic Programme

- On Solar Photo-Voltaic Programme an expenditure of Rs 69.11 crores was incurred during the period 1986-92 which constituted 62 per cent of the total expenditure on the Solar Energy Programme. There were substantial shortfalls in achievements. Most of the systems installed were not working mainly due to lack of proper maintenance, poor performance of the systems and apathy of the local users. In eight States, 3105 street lighting systems (56.5 per cent) were not working out of 5496 systems surveyed. The average failure rate ranged from 33 to 100 per cent. In the case of domestic lighting systems, the failure rate ranged from 25 to 94 per cent in four States. In six States, not a single community TV system had been installed and in twelve States, a negligible number of such systems were installed. Due to non-availability of evaluation reports, the number of systems in working condition could not be ascertained. In the case of water pumps, 1181 pumps had been installed in various States as on 31st December 1991. The failure rate of the systems ranged from 41 to 100 per cent in five States surveyed. Pump capacity had not been found to be suitable either for drinking water applications or for micro-irrigation purposes. This was due to lack of comprehensive site selection procedure. There were many cases of installation of PV systems at offices and residences of high officials contrary to the guidelines for the programme.

Coordination between receipt and issue in respect of important items of inventory was wanting. This resulted in overstocking, non-availability of details of closing stock and materials

consumed in some States. Systems costing Rs 1.28 crores could not be utilised in two States due to coordination problems.

In Uttar Pradesh, Orissa and Andhra Pradesh, no measures for proper monitoring had been evolved, there was no regular feed back from the field units and no regular survey was carried out by any officer to assess how well a system worked after commissioning.

R & D activity had cost Rs 13.18 crores during the period 1986-92. Cases of non-submission of final reports on projects, failure to achieve objectives and delay in completion of projects came to notice.

(Para 5.1.6)

Solar Thermal

An expenditure of Rs 42.30 crores was incurred during the period 1986-92 on the Solar Thermal Programme which constituted 38 per cent of the total expenditure on the Solar Energy Programme. In ten States test checked in audit, Rs 8.80 crores remained unutilised. There was underutilisation of funds for research and develoment (R&D) to the extent of Rs 192.70 lakhs during 1986-92. Cases of infructuous expenditure also came to notice in audit.

In the solar thermal applications, in different States test checked by Audit, there had been considerable shortfall in achievement. Large number of solar thermal systems installed were either malfunctioning or not functioning due to technical reasons , improper site selection, non-maintenance and non-availability of water etc. Cases of non completion of the projects resulting in infructuous release of grants or subsidy were noticed.

A sum of Rs 2.46 crores was given as subsidy for this application during 1986-92. Targets had not been made available by the Ministry. However, in test check in States it was observed that targets had been fixed and there had been shortfall in achievements. There was difference between the

sale figures given by the States and those available at the Ministry resulting in excess release of subsidy to the extent of Rs 40.08 lakhs during 1986-92. In seven States/Union Territory, there was no sale of solar cookers and in six States Union Territories the sale was negligible. In respect of community solar cooker, details of sale were not available except in two States. It was not finding adequate acceptability owing to its size and associated handling problems. Although the principal responsibility for quality control was vested with the State nodal agencies, no report on inspections either by the nodal agencies or as the Ministry officials was available in the records of the Ministry. There was nothing on record to show whether the publicity programmes sanctioned by the Ministry at a cost of Rs 4.50 lakhs to various State nodal agencies had actually been undertaken by them. In Madhya Pradesh, inventory worth Rs 8.42 lakhs was irrepairable and had to be proposed for write off. In Uttar Pradesh, sales remained confined to the urban areas whereas the main objective was to reach rural people.

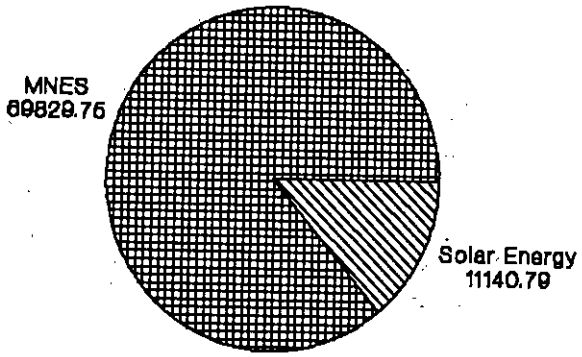
(Para 5.1.7)

5.1.4 Expenditure

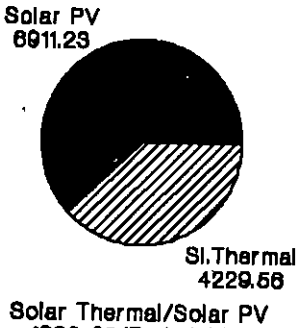
The yearwise expenditure for the Ministry and those on Solar Energy during the period 1986-92 are shown below:

	Expenditure (Rs in lakhs)	
Year	For the Ministry	On Solar Energy
1986-87	12480.42	1557.97
1987-88	9935.52	1550.51
1988-89	11531.72	2444.95
1989-90	11066.58	1687.12
1990-91	11265.51	1804.54
1991-92	13550.00(RE)	2095.70
	69829.75	11140.79

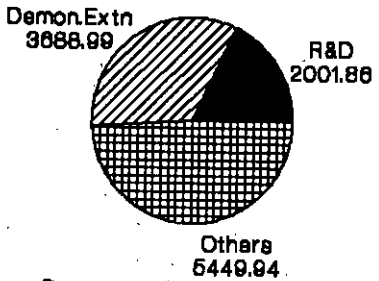
EXPENDITURE (SOLAR ENERGY)
1986-92 (Rs in lakhs)



MNES/Solar Energy



Solar Thermal/Solar PV
1986-92/Rs in lakhs



Demonstration/R&D/Others
1986-92/Rs in lakhs

Expenditure of the Ministry of Non-Conventional Energy Sources (MNES) for the period 1986-92 was Rs 698.30 crores out of which Rs 111.41 crores (16 **per cent**) was on Solar Energy Programmes two components or which were Solar Photo-Voltaic (SPV) Programme and Solar Thermal Energy Programme (STEP).

5.1.5 Strategy

The development strategy adopted for the two areas of Solar Energy is through undertaking projects for R&D and organising programmes for demonstration and extension.

For promotion of R&D activities, the Ministry directly releases funds to R&D organisations, viz universities or other institutes and individuals associated with research institutes, after prioritisation of the projects proposed. Extension and demonstration programmes are executed through the State nodal agencies which are organisations of the States/Union Territories identified by the States/Union Territories and/or the Ministry to coordinate and implement the scheme in the respective States/UTs, on cost sharing basis. Based on the proposals (annual plans) received from the State nodal agencies every year, the schemes are drawn up and quantum of subsidy fixed keeping in view total funds available with the Ministry, technical manpower available with the concerned nodal agency, past performance of the nodal agency and viability of the projects generated by the nodal agency. The implementing agencies submit their annual plans, through State Governments, for approval to the Ministry.

Progress of the approved projects/schemes is monitored through specially designed monitoring reports, periodic meetings and site visits by the officials of the Ministry.

5.1.6 Solar Photo-Voltaic Programme

A. SPV technology enables direct conversion of sunlight into electricity which is stored in batteries for subsequent use or used directly for powering appliances such as water pumps etc. PV systems are easy to transport and install, require no fuel for operation, have no moving parts, are noise and pollution free and require very little maintenance. They are thus ideally suited for applications in rural areas, remote and isolated locations and other places where conventional electricity supply is not available or is unreliable.

The SPV demonstration and utilisation programme was intended inter alia, to bring awareness of merits and utility of PV technology among different categories of users.

The programme had four major applications viz Street Lighting System, Domestic Lighting System, Community Light and TV system, and Water pumping system for drinking water supply and micro irrigation.

Since 1985, the Indian PV industry has been manufacturing PV modules on commercial basis. Presently, there are several companies including Central Electronics Limited (CEL) and Bharat Heavy Electricals Limited (BHEL) engaged in production of solar cells, modules or systems.

As per the report of ASCI, as on 31st December 1991, 34839 street lighting systems, 5050 domestic lighting units, 1181 solar water pumping systems and 59 PV Power plants had been installed in the country using PV technology. The Ministry, however, stated (April 1993) that based on reports from the States, 28756 street lighting systems, 11559 domestic lighting systems, 742 solar water pumping systems, 713 community TV/lights and 63 SPV power plants (244 KW) were installed upto 31st March 1992. The discrepancies in the figures were not explained by the Ministry.

Budget estimates and actual expenditure for the period 1986-92 were as follows:

Year	Budget Estimates	Revised Estimates	Actual Expenditure
		(Rs in lakhs)	
1986-87	561.00	807.00	817.98
1987-88	814.31	884.80	898.36
1988-89	1034.00	974.00	1888.53
1989-90	979.00	1049.00	989.96
1990-91	1158.00	1054.00	1094.46
1991-92	1261.00	1257.00	1221.94
Total	5807.31	6025.80	6911.23

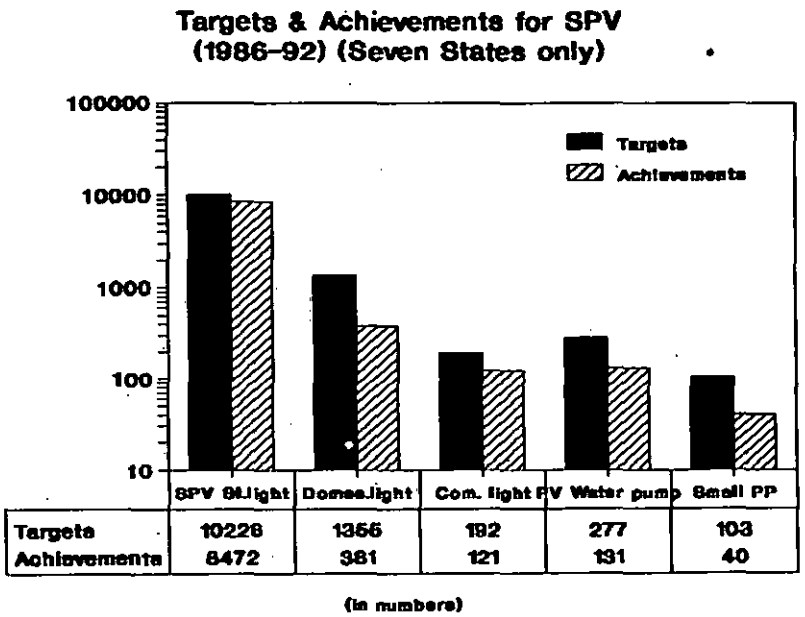
The excess expenditure, during 1986-92, over original budget allocations was Rs 1103.92 lakhs (19 **per cent** of the budget). The Ministry stated (April 1993) that based on requests from the States, additional funds are mobilised within the Ministry through internal reappropriation.

Yearwise targets and achievements for major applications during 1986-92 are given below (State wise break up had not been fixed by the Ministry):

System	1986-87		1987-88		1988-89		1989-90		1990-91		1991-92	
	T	A	T	A	T	A	T	A	T	A	T	A
Water pumping systems	300	175	300	364	100	191	100	70	50	56	50	4
Street lighting systems	300	1578	300	2356	3000	5137	3000	6840	2000	5500	2000	3200
Community TV/lighting	45	15	50	251	100	101	100	178	50	180	-	86
Domestic lighting	-	-	500	200	500	529	100	779	1000	1542	3000	8509
SPV power plants and other systems (in KW)	-	50	100	102.5	100	960	100	84.0	100	98.2	100	98.0
Total KW	139.5	212.18	257.0	354.1	362.0	520.2	349.2	597.9	285.0	551.7	334.0	589.40

* T - Target and achievement for first four applications are in numbers

Targets and achievements (in numbers) for SPV Programme in seven States test checked by Audit revealed shortfall in achievements as indicated below:



B. Methodology for implementation

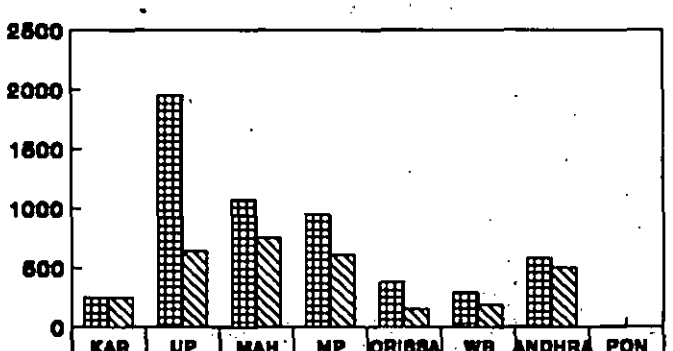
The heart of the PV system are the PV modules. Efficiency and performance of a PV system depends on quality, size and configuration of the PV cells used in the systems. The strategy, therefore, has been to ensure supply of PV modules for the systems in the four major areas of application, to be installed by various States.

After ascertaining requirements for various systems from all State governments, at the commencement of the financial year, the Ministry places orders mainly on two Public Sector Undertakings viz CEL and BHEL for supply of PV modules directly. While the Ministry supplies/arranges the PV modules, the balance of systems (BOS) is to be provided by the nodal agency and the State government indicates the priority for installation. The State nodal agencies are responsible for identifying beneficiary villages/ individuals and for ensuring proper operation and maintenance after installation. The share of the Government of India varies from 45 to 55 per cent of the total cost.

C. Solar street lighting system

In eight States, Administrative Staff College of India (ASCI) surveyed 5496 systems in 1990-91 and observed 3105 to be non-functional as shown below:

Non-functioning of SLS on the basis of evaluation studies in 8 States



	KAR	UP	MAH	MP	ORISSA	WB	ANDHRA	PON
Sys. Surveyed	252	1950	1076	955	380	280	588	7
Sys. not working	252	645	749	617	147	190	500	5

(In Numbers)

Sys. Surveyed Sys. not working

SLS:STREET LIGHTING SYSTEMS

The average rate of failure of working of systems surveyed in the above States ranged from 33 to 100 **per cent** which indicated that the PV street lighting system was not successful. ASCI attributed reasons for failure to faults in the converter,timer, lack of battery maintenance. At the time of supply of PV modules to the nodal agencies, the Ministry should have considered the aspect of upkeep and maintenance which was not taken into account. The Ministry stated (April 1993) that the ASCI reports had been used to carry out improvements in the systems as also changes in the programme. The number of street lighting systems was being brought down in favour of domestic lighting systems which were better looked after.

In Tamil Nadu, out of 939 SPV street lighting units installed upto 31st March 1989 at a cost of Rs 127.80 lakhs, 59 only were functioning in December 1991. The remaining 880 nos costing Rs 119.77 lakhs had gone out of order.

In UP, the SPV street lighting system installations at a total expenditure of Rs 345.72 lakhs had failed due to malfunctioning, poor performance and lack of maintenance resulting in wasteful expenditure of Rs 345.72 lakhs.

In Karnataka, almost all the street lights in 85 villages and six hamlets were not functioning due to poor maintenance thus resulting in wastage of Rs 34.50 lakhs.

D. Solar domestic lighting system

These were of three types, viz, fixed domestic lighting unit, portable lighting units like lanterns and service connection from PV power plants.

There were 5050 PV domestic lighting units installed in the country as on 31st December 1991. The study conducted by ASCI in November 1990 indicated the following position in some States:

State	Number of systems evaluated	Number of systems not working	System not working **(in percentage)**
Maharashtra	54	41	76
Madhya Pradesh	36	34	94

Uttar Pradesh	412	102	25
Andhra Pradesh	48	45	94
	550	222	

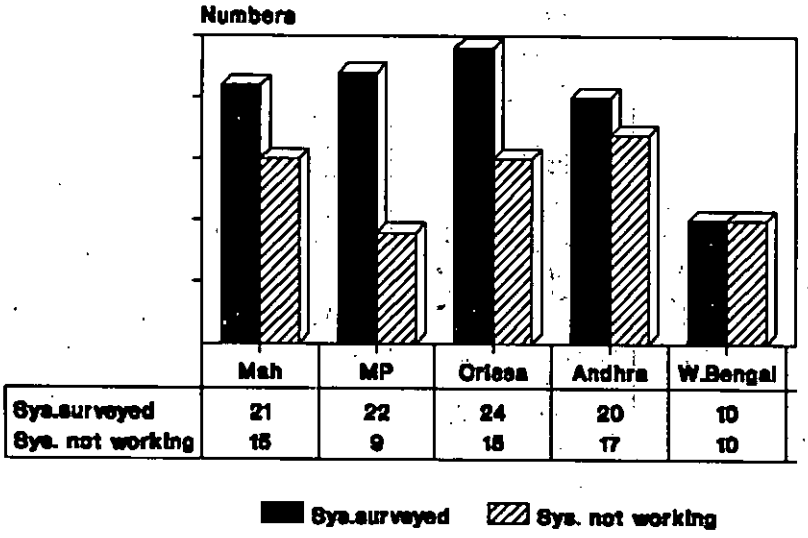
The failure rate ranged from 25 to 94 **per cent**. In Rajasthan, due to lack of maintenance 4500 systems (83 **per cent**) went out of order; 2205 systems were rectified but 2295 systems installed at a cost of Rs 344.25 lakhs remained non-functional, as on March 1992, mainly because of lack of regular maintenance after installation. The expenditure of Rs 344.25 lakhs, on installation of 2295 systems, was thus unfruitful.

The Ministry stated (April 1993) that improved versions of the solar domestic lighting systems are being developed and given to users.

E. Solar water pumping systems

SPV water pumps are intended for irrigation of small farms as also for drinking water and 1181 such pumps had been installed by 31st December 1991. A survey conducted by ASCI in 1989-91 in five States showed the following results:

Non-functioning of PVWP on the basis of Survey conducted



The rate of failure ranged from 41 to 100 per cent in the five States surveyed. Pump capacity had been found to be unsuitable either for drinking water supply applications or for micro irrigation purposes. This was due to lack of comprehensive site selection procedure.

Non working of systems were attributed to absence of security which caused motors to be removed from water pumping system or improper site location resulting in low water table and thereby leading to system failure.

Some beneficiaries had dismantled their systems out of fear of theft and damage in the field which were quite far away from their residences. Also they were not satisfied with the water discharge for their fields or any other purpose. The quantity of water discharged was more suitable for vegetable and fruit gardens rather than sugarcane and paddy fields. Problems faced by agricultural beneficiaries were not attended to immediately because the implementing agency was looking after other projects as well.

In Uttar Pradesh, between 1985-86 and 1989-90, 168 pumps were installed at a total cost of Rs 66.44 lakhs. The pumps did not prove useful especially during summer when water was needed most.

ASCI found that beneficiaries had lost interest in using the system due to low out-put, problem of maintenance of pumps in inaccessible areas, failures of pumps to lift water etc.

The Ministry stated (April 1993) that keeping in view problems of the system in the field, the programme was practically discontinued in 1990 and that it was proposed to launch a new water pumping programme with larger capacity pumps.

F. Solar Community TV system

The Ministry had been able to instal through State nodal agencies only 938 community lighting/TV systems in various States as on 31st December 1991. Not a single community TV lighting system could be installed in Assam, Manipur, Meghalaya, Chandigarh, Dadar and Nagar Haveli and Pondicherry. In the following States, a negligible number of systems had been installed:

State	No. of systems installed
Andhra Pradesh	6
Arunachal Pradesh	14
Goa	4
Himachal Pradesh	9
Jammu & Kashmir	3
Karnataka	2
Kerala	11
Mizoram	1
Nagaland	3
Sikkam	3
West Bengal	1
Delhi	2

Due to non-availability of evaluation reports it could not be verified how many systems were actually in working condition. The low level of installation showed that the TV systems were not popular with users. The Ministry stated (April 1993) that the systems installed were based on requests received from the States and there were a few States which did not take up this application.

Seventy two SPV TV and 12 SPV refrigerators were installed during 1986-91 at a total cost of Rs 15.48 lakhs. SPV refrigeration system was discontinued from 1988-89 and Solar SPV TV system discontinued from 1991-92 due to lack of response from users, resulting in wasteful expenditure of Rs 15.48 lakhs.

G. Improper selection of site

The Ministry's guidelines indicated that SPV street lighting and domestic lighting system should generally be installed at unelectrified locations.

In Uttar Pradesh 37 street lighting systems, five street lighting systems in West Bengal and 35 street lighting systems in Rajasthan were installed at the government/ semi government offices and in other areas where conventional electrical power supply existed. This was not in conformity with the programme objective of using the solar PV street lighting systems as stand-alone systems in rural and remote areas outside the supply network of conventional electrical power. The Ministry stated (April 1993) that the SPV systems installed in Government and semi-Government offices had good demonstration effect. The

Ministry added that the States had been requested to send specific information on the cases mentioned.

In Madhya Pradesh, there was no system for regular assessment of requirements. There were also no records to register the demands. The nodal agency did not offer any comments on how they were ensuring that proper sites were being selected.

H. Inventory

The nodal agency is responsible for setting up infrastructure, purchase of balance of system (BOS), identification of beneficiaries and other steps for installation. The Ministry, as per cost sharing arrangement, places orders directly on selected suppliers for supply of PV modules and intimates the concerned nodal agency which then has to co-ordinate receipt and issue for making installations.

A perusal of inventory in the States however revealed that co-ordination between receipt and issue in respect of many important items of inventory such as PV modules, solar pumps, accessories of street lighting system was wanting. As a result, these materials were shown piled up in stock for long time.

Deficiencies noticed in different States with regard to stores and stock are given follows:

i) Overstocking : In Bihar, there was overstocking as below:

Item	Opening balance	Receipt	Date	Issue	Upto (date)	Closing balance
Solar Pumps	-	30	25.2.1987	7	26.6.1987	23
	23	16	27.6.1987	3	02.8.1987	36
	36	14	03.8.1987	8	04.4.1988	42
	42	10	05.4.1988	25	20.6.1992	27
EL-100 6V	86	18	03.3.1990	20	20.9.1990	
Exide Battery		36	17.8.1990	8	29.5.1991	
		24	05.9.1990	4	29.10.1991	
		10	14.9.1990	6	06.2.1992	136
Timer for street lighting	12	120	19.2.1988	121	08.6.1989	11 (Reported damaged)
Street light support	182	-	-	-	20.7.1992	182

ii) Details of closing stock/materials consumed not available: In Madhya Pradesh, the requirement indicated to the Ministry, purchase orders placed and supplies obtained in respect of SPV lanterns was not furnished by the nodal agency (August 1992). Details of yearwise quantities of materials purchased and their financial value, material consumed and closing stock were not made available to Audit (August 1992). As a result overstocking/understocking during the period 1986-92 could not be analysed. The nodal agency could furnish only the monetary value of the closing stock at the end of each year from 1986-87 to 1991-92 as mentioned below:

Year	Closing stock (Rs in lakhs)
1986-87	0.81
1987-88	1.54
1988-89	7.77
1989-90	10.44
1990-91	14.92
1991-92	28.40

It would be seen from the above details that the closing stock showed a steadily increasing trend. The reasons for piling up of stock were not analysed to take remedial measures. The nodal agency stated, in August 1992, that the position of damaged and defective modules and other systems(BOS) was not readily available.

iii) Idle equipment/systems

In Maharashtra, of the 570 modules received during August-October 1990 from the Ministry, 487 modules valued at Rs 24.89 lakhs were kept idle in stock till July 1992. This was due to non-identification of sites for their installation.

In West Bengal, out of 1384 SPV panels, 1228 BOS and 970 battery sets procured/received by WBSEB during 1985-92, 638 units were installed leaving a balance of 746 SPV panels, 590 BOS and 332 battery sets (total cost Rs 84.76 lakhs) with WBSEB . During the course of physical verification (May 1992), 94 sets of BOS costing Rs 1.88 lakhs (out of 590 sets) were found defective. All equipments/ components of 81 SPV street lights, one SPV TV, one Wind pump and one SPV water pump which were

installed at a cost of Rs 18.45 lakhs in seven remote villages were out of order stolen/damaged.

The Ministry stated (April 1993) that the States had been requested to respond.

I. Monitoring and Evaluation

The working group for the Seventh Plan for the Ministry set up by the Planning Commission stressed on intensive as well as extensive monitoring and evaluation, both departmentally and through outside agencies, of the operational programme and thereby adopting improvements and corrective measures as required to effect further improvements in technical divisions and cost reduction.

Reports from State agencies were being received in the Ministry 2-3 times a year which had been changed to monthly reporting. Inspection reports were being submitted by monitoring cells and regional offices. Specific studies had been commissioned by the Ministry through ASCI and other independent institutions. Evaluation of some of the systems installed in various States by ASCI between 1989-91 had revealed that most of the systems installed were not working mainly due to lack of proper maintenance, poor performance of the system and apathy of the local users.

In the test check conducted by Audit in UP, Orissa, Andhra Pradesh and West Bengal it was observed that the nodal agencies had not initiated any measures for proper monitoring of performance of the PV systems already installed and commissioned. No regular survey was carried out by any one to assess how well a system worked after commissioning.

J. Research and development

Expenditure on R&D during the period 1986-92 had been Rs 1318.29 lakhs. Progress of the projects is monitored by obtaining periodic progress reports, visits to laboratories and through meetings in the Ministry. The quarterly progress reports sent by the Project Investigators (PI) are evaluated by the Ministry and are used to monitor the project as per activities planned. The PI of the project has also to submit audited statement of accounts, utilisation certificates and list of assets every year. Such information is to be the basis for

further release of funds for the project. For major projects, co-ordination meetings are held atleast twice a year. For projects where coordination meetings are not held, scientific officers of the Ministry undertake on the spot monitoring atleast once a year. Despite this elaborate procedure, prescribed information and upto date status of R&D projects including transfer of technology to users could not be provided to Audit. However, Some cases seen in test check revealed :

(i) A project on development of Amorphous Silicon Solar Cells was sanctioned in December 1983 to the Indian Institute of Technology (IIT), New Delhi at a cost of Rs 17.38 lakhs (equipment: Rs 10 lakhs) for a duration of five years. There were four subsequent revisions in the projects cost, in March 1984 to Rs 18.57 lakhs (equipment: Rs 10.69 lakhs), in July 1984 to Rs 43.07 lakhs (equipment : Rs 35.19 lakhs), in December 1985 to Rs 47.16 lakhs (equipment : Rs 39.28 lakhs). In April 1989, the project was extended for another two years upto December 1990 and its cost was further revised to Rs 53.98 lakhs.

IIT refunded an unspent amount of Rs 1.50 lakhs in December 1991 but completion report, utilisation certificate, list of assets and statement of accounts have not been submitted (September 1992) as a result of which further evalution of the results of the research was not known. The frequent revisions in the project cost were indicative of inadequate perception of the requirements of the projects.

Accepting that the completion report had not been received, the Ministry stated (April 1993) that the project was evaluated in coordination meetings. The fact, however, remains that further action on the research results cannot be taken in the absence of the completion report.

(ii) The project on production of silane (a gaseous compound of silicon) for amorphous and polysilicon applications at Indian Institute of Science, Bangalore was sanctioned by the Ministry in February 1989 for " Pilot plant studies for preparation of silane for Amorphous silicon solar cells Phase-II" at a total cost of Rs 62.43 lakhs for a duration of two years from January 1989. The project was extended upto 31st March 1992. The project is still in progress even after four years against the targetted period of two years. In the meanwhile the cost has been revised (January 1992) to Rs 67.43 lakhs. The Ministry stated (April 1993) that the

project was completed in September 1992 and efforts were being made to upscale the process.

(iii) The project on development of solar panels was sanctioned in March 1980 for a period of two years to Central Electronics Engineering Research Institute (CEERI), Pilani at a capital outlay of Rs 20.22 lakhs. The project was completed in March 1984. The expert evaluating the project stated in December 1984 that the project had achieved rather limited success 'on its six goals'. He also opined that the investigator was not fully conversant with the latest development and trends in the field. Thus the investment of Rs 16.16 lakhs on the R&D activities did not produce the desired results. The Ministry stated (April 1993) that such research projects did not always yield the desired results and it should be viewed as a part of overall national effort aimed at developing a new technology in the Country.

K. The Ministry stated (April 1993) that a number of valuable lessons have been learnt by the manufacturers, by the State agencies and by the Ministry itself, in implementing the programmes and that this experience was being used in the design and implementation of the new programmes.

5.1.7 Solar Thermal Programme

A. Solar Thermal Programme was intended to develop, demonstrate and promote use of technologies for conversion of solar energy into thermal energy for supplementing the demand for thermal energy or through further conversion for electrical energy. The objective of this programme was to provide low grade thermal energy which besides saving conventional energy, would also help in arresting environmental degradation. This could be done by creating mass awareness regarding the use of non-conventional energy sources and by creating industrial infrastructure in the country for manufacturing of these solar thermal devices. For the period 1986-92, a total expenditure of Rs 4229.56 lakhs was incurred on this component. Rs 880.08 lakhs could not be utilised in ten States. The programme had six major applications viz solar cooker, solar water heating system (industrial/commercial), solar water heating system (domestic), solar timber kiln, solar still/desalination and solar air heater.

The yearwise details of budget estimates, revised estimates and actual expenditure are given below:

Year	Budget Estimate	Revised Estimate	Actuals
		(Rs in lakhs)	
1986-87	474.00	788.00	739.99
1987-88	668.69	658.20	652.15
1988-89	596.00	596.00	556.42
1989-90	778.00	798.00	697.16
1990-91	828.00	756.00	710.08
1991-92	1259.00	973.00	873.76
Total	4603.69	4569.20	4229.56

Details of targets and achievements in the Solar Thermal Programme (application wise) for the period 1986-92 in respect of States/Union Territories test checked in audit are given below:

	TARGETS						ACHIEVEMENTS					
State	Solar Cooker	SWHS Industrial/ commercial	SWHS Domestic	Solar Air Heater	Solar Timber Kiln	Solar stills/ Desalination	Solar Cooker	SWHS Industrial/ commercial	SWHS Domestic	Solar Air Heater	Solar Timber Kiln	Solar stills/ Desalination
Andhra Pradesh	3991	178	129	-	-	-	908	116	46	-	-	-
Bihar	5800	27	-	-	-	-	321	17	-	-	-	-
Haryana	5500	-	318	-	-	-	6651	-	231	-	-	-
Karnataka	-	208	1102	4 60m2	3 14m3	6 75m2	-	146	1159	-	1	1
Madhya Pradesh	-	400000 (lpd)	-	-	-	-	-	572250(lpd)	-	-	-	-
Maharashtra	15000	29 8350m2	110 300m2	- 120m2	2 14m3	13 125m2	11087	73 12725m2	17 1244m2	- 84m2	-	8 99m2
Orissa	300	-	86650(lpd)	-	-	660(lpd)	142	-	20850(lpd)	-	-	325(lpd)
Punjab	6200	331	364	-	6	50	2056	190	164	-	5	50
Pondicherry	-	293	85	-	-	104	-	50	16	-	-	-
Rajasthan	38900	365000 (lpd)	-	-	-	-	26631	156200 (lpd)	-	-	-	-
Tamil Nadu	1400	-	-	-	-	-	236	-	-	-	-	-
Uttar Pradesh	23625	-	-	-	-	-	14405	-	-	-	-	-

West Bengal	2300	199	-	13		216	1913	95	-		8	-	54
	103016	1265	2108	17	11	389	64350	687	1633		8	6	113
		+765000(lpd)	+300m2	+180m2	+28m3	+200m2		+12725m2	+1244m2		+84m2		+99m2
		+8350m2	+866501pd			6601pd		+7284501pd	+208501pd				+3251pd

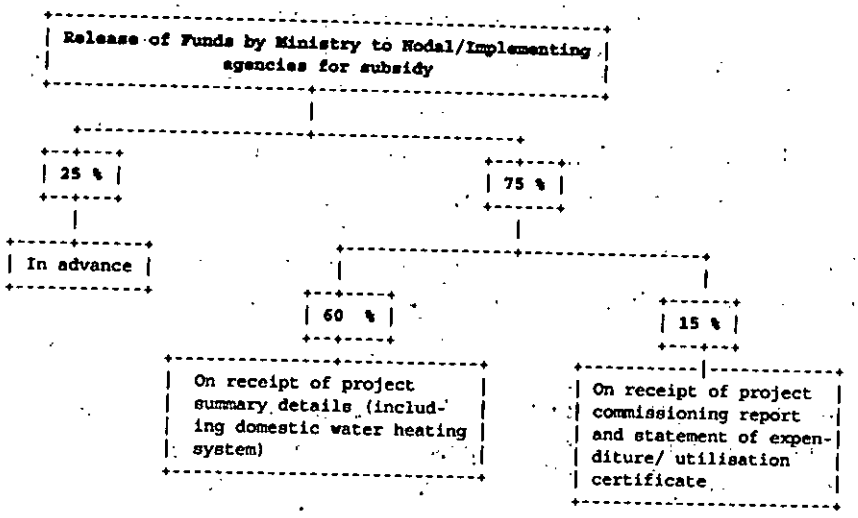
Units: In number, in collector area (square metres), in volume (in cubic metres) and in volume of water handled in litres per day (lpd).

Solar Thermal Extension Programme to promote use of low grade solar thermal devices by domestic, industrial and commercial sector was introduced in April 1984. The programme is drawn annually giving details of physical and financial targets as well as financial and administrative procedures. Implementing agency are identified by the respective State Government in consultation with the Ministry. Site is selected by the nodal agency of the State Government and priority is to be given to projects requiring minimum central subsidy and in areas of SC/ST inhabitation.

Physical and financial targets are given to the State nodal agency on yearly basis. These targets are fixed by the Ministry keeping in view the funds available, technical manpower available with the concerned State nodal agency, past performance of the State nodal agency and the scope for these devices in the State for that particular year as per the projects generated by the nodal agency.

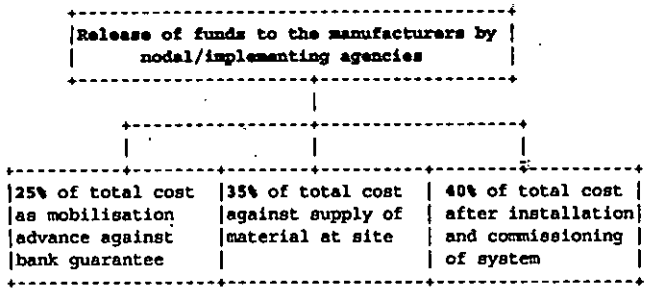
In the last quarter of the financial year if a nodal agency does not submit the required information or does not generate the required number of projects in accordance with the targets given by the Ministry, the funds allocated to the State are diverted to other States which generate more projects. Targets fixed at the beginning of the year may therefore change as per the requirements of the States towards the end of the year.

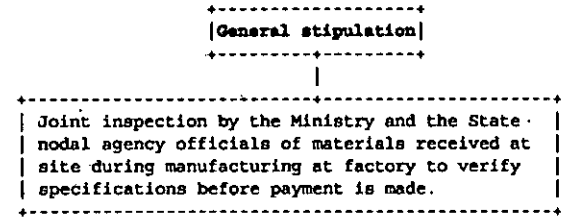
In the initial years of the programme a higher rate of subsidy was given to the users of these devices for creating mass awareness for utilisation of these devices. During that period, users belonging to Government sector, educational institutions, charitable trusts etc were given subsidy upto 100 **per cent**. Details of the subsidy schemes are depicted below:



General stipulation

1	2	3	4	5
Performance of system should be recorded by the manufacturer for a week to assess the output of the system, authenticated by the user and nodal agencies.	Funds released duly to manufacturer on behalf of user and not to user agency directly.	Implementing agency shall submit Statement of accounts and utilisation certificate at the end of each financial year.	Nodal agencies entitled to 10 per cent of Ministry's liabilities to cost of system, as service charges for all sites other than its own and payment released only after completion of project.	Service charges at 10 per cent (Rs 300 minimum) of Ministry's subsidy for installation of domestic water heating system.





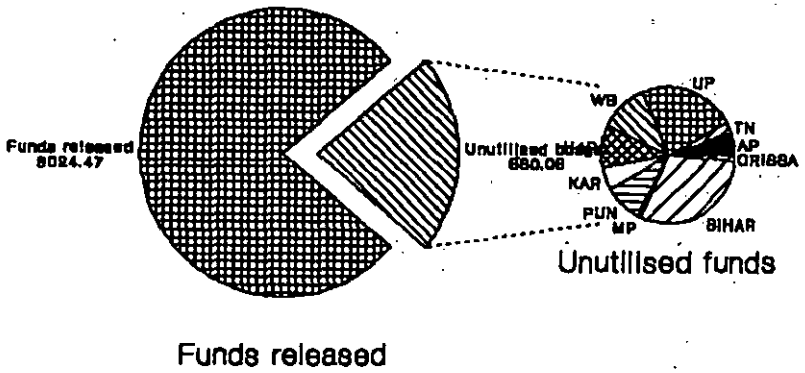
Over the successive years, the subsidy was to be reduced gradually with a view to withdraw it after some time and leave the technology to market forces.

B. Unutilised funds

Test check of funds released and actual expenditure incurred in ten States revealed that Rs 880.08 lakhs remained unutilised with the State nodal agencies as shown below:

State	Funds Received	Actual expenditure	Funds unutilised
		(Rupees in lakhs)	
Andhra Pradesh	112.57	64.02	48.55
Bihar	345.43	77.60	267.83
Utter Pradesh	1215.93	1010.76	205.17
West Bengal	162.98	58.79	104.19
Haryana	235.26	145.33	89.93
Karnataka	168.01	117.93	50.08
Punjab	280.87	202.88	77.99
Madhya Pradesh	310.77	302.95	7.82
Tamil Nadu	141.02	124.92	16.10
Orissa	51.63	39.21	12.42
	3024.47	2144.39	880.08

Unutilised funds
Solar Thermal Programme
(Rs in lakhs)



Funds released

C. Research and development

R&D activities are aimed at developing technologies for efficient, durable and low cost materials and systems and promoting their commercialisation. This is sought to be achieved through direct funding of R&D projects and by creating infrastructural facility for R&D and demonstration.

R&D activities are directed mainly towards prototype development and demonstration, listing and standardisation; materials and solar collector technologies; solar heating and cooling systems; solar passive system and solar power plants.

Under R&D activities there was a total budget provision for 1986-92 of Rs 876.27 lakhs, out of which Rs 192.70 lakhs remained unutilised. The actual expenditure during 1990-91 and 1991-92 were only 22 and 29 **per cent** respectively of the budget allocations for these years. The Ministry stated that projects are funded only after it is recommended by the Solar Thermal Research Advisory Committee. In some cases certain projects could not be taken up because of various techno-economic reasons. These projects will be taken up in subsequent years.

During 1987-90, 34 projects were undertaken at an estimated cost of Rs 496.97 lakhs. Of these, seven were completed and the balance 27 were ongoing.

Test check of some R&D projects revealed as follows:

(i) A project on design and development of vapour absorption pumps and heat transformers for domestic, agricultural and industrial applications, involving an expenditure of Rs 20.67 lakhs was sanctioned to IIT, Madras in March 1987. The project was scheduled to be completed by March 1991 but was being considered for closure because projects report were not being received regularly as per schedule. The project is yet to be completed. The Ministry has released over Rs 13 lakhs so far (November 1992)

(ii) Proposal of setting up of solar pond for a dairy plant with Gujarat Energy Development Agency in collaboration with Gujarat Dairy Development Corporation and Tata Energy Research Institute, New Delhi in three phases of 48 months duration was sanctioned in February 1984 at a total outlay of Rs 49.99 lakhs. First phase was designing the pond within 8 months at a cost of Rs 0.96 lakh. The second phase of pond construction and establishing heat extraction and thermal application system for process heat was to be completed in 24 months after first phase at a total outlay of Rs 34.24 lakhs which was subsequently revised to Rs 42.17 lakhs in February 1987 and to Rs 62.10 lakhs in March 1990. The total outlay of Rs 62.10 lakhs for second phase had been fully released by March 1992.

The solar pond meanwhile developed some defects. The Review Committee which visited solar pond during August 1991 assessed the nature of defects and requirements of repairs thereon and accordingly proposed revision of the outlay to Rs 87.30 lakhs and extension of the project upto March 1993.

Thus the project sanctioned in 1984 at a total outlay of Rs 49.99 lakhs to be completed in three phases in 48 months could not be completed (March 1993) even after five years of the stipulated date. While Rs 62.10 lakhs had already been invested, the total investment was likely to be Rs 87.30 lakhs against the originally sanctioned cost of Rs 49.99 lakhs.

The Ministry stated, in March 1993, that process heat could not be supplied to Bhuj Dairy because of non-availability of the heat exchanger. The pond is being

recommissioned after the failure of lining system and it is expected that once the pond is commissioned the objective of supplying process heat to Bhuj Dairy would be fulfilled.

(iii) Similarly another project 'Solar Thermal Pump Phase III' was sanctioned to BHEL in November 1988 for a duration of three years at a total estimated cost of Rs 76 lakhs to be borne by the Ministry and DM 1.9 million by German Government for which the Ministry released Rs 43.85 lakhs till February 1992. BHEL revised the scope of work with an additional amount of Rs 23.90 lakhs for Indian components and Rs 23.50 lakhs for import of spares, thus increasing the cost of project to Rs 111.35 lakhs. The project which was to be completed by November 1991 within estimated budget of Rs 76 lakhs was still incomplete. The Ministry stated, in March 1993, that based on results of testing the pump imported from Germany, another indigenously fabricated pump would be installed by BHEL at some later stage. Thus the schedule for completion of project remains indefinite.

D. Solar Energy Centre (SEC) was established in 1982 as a national Centre to promote use of renewable energy technologies by R&D testing, standardisation, prototype development, technology transfer, demonstration/field testing and manpower development. The Centre was intended to provide a link among Government, industry and research institutes at national as well as international levels. Apart from testing facilities, SEC is engaged in development of solar power generation through thermal route.

Nine files pertaining to procurement of stores, and payment of customs duty, through Solar Energy Centre were not made available to Audit on the ground that these had been handed over to the Central Bureau of Investigation (CBI).

A-50 KW solar energy thermal power plant for R&D purpose was commissioned in April 1989 at SEC at a total cost of RS 219.31 lakhs. It produced 2050 KWh during April 1989 to March 1990 which was negligible compared to its capacity. The Ministry stated, in March 1993, that the supplier had failed to supply some critical components and spares which had affected the operation of this plant.

E. Solar Cooker programme

Solar cooker programme was aimed at popularising use of Solar energy in cooking in order to save fuel and control

pollution. The programme includes subsidised sale of Solar cookers and was launched in 1982.

Statewise position of solar cookers sold as furnished by the Ministry are given below (no targets had been made available):

Statewise/Yearwise sale of solar cookers

S.No	State	Upto 1986-87	During 1987-88	1988-89	1989-90	1990-91	1991-92	Cumulative total
1.	Andhra Pradesh	-	174	25	-	-	507	706
2.	Assam	-	-	-	-	-	-	-
3.	Arunachal Pradesh	-	-	-	-	-	-	-
4.	Andaman Nicobar	-	-	15	13	10	-	38
5.	Bihar	-	-	-	-	-	-	-
6.	Chandigarh	-	393	175	-	-	-	568
7.	Delhi	4951	3427	3440	3594	2063	2869	20344
8.	Goa	-	197	197	158	242	-	794
9.	Gujarat	4952	3334	4101	2559	2676	2930	20552
10	Haryana	Up to the year			2346	-	6449	8795
11	H.P.	367	495	672	1764	2855	4309	10462
12	J&K	-	-	-	-	-	-	-
13	Karnataka	-	-	-	-	-	-	-
14	Kerala	-	-	-	-	149	-	149
15	Manipur	-	-	-	-	-	200	200
16	Meghalaya	-	-	284	316	132	-	732
17	Maharashtra	14721	1545	2000	4855	5656	5811	34588
18	M.P.	2529	3759	12678	14984	17527	20500	71977
19	Mizoram	-	-	-	-	70	-	70
20	Nagaland	-	-	-	-	-	-	-
21	Punjab	78	638	362	765	2569	2056	6468
22	Orissa	475	118	44	18	114	*	769
23	Rajasthan	6933	6127	5156	3426	1700	2052	25389
24	Sikkim	5	11	4	-	-	*	20
25	Tamilnadu	958	28	7	84	95	132	1304
26	Tripura	-	-	-	-	-	-	-
27	Uttar Pradesh	8371	1664	677	1490	2094	7000	21296
28	West Bengal	230	789	493	559	200	*	2271
29	Pondicherry	-	-	-	-	-	-	-
30	Dadra Nagar Haveli	-	-	-	-	81	*	81
31	Lakshadweep	-	-	-	-	-	-	-
Total		44570	22699	30330	36926	38233	54815	227573

However in test check of eleven States in audit, it was observed that targets had been set in all States. The sale figures available in the records of the States did not agree with those furnished by the Ministry in all the eleven cases.

During 1986-92, Rs 246 lakhs was given as subsidy for this application and as against the target of 103,016 solar cookers in ten States the achievement was 64350 (62.5 **per cent**).

The principal responsibility for quality control in the States was of the respective State nodal agencies. No information was available to show whether technical committees were formed by the nodal agencies or any inspection undertaken to ensure quality control. From 1990-91 onwards, all the community size solar cooker models were to be got tested by the Solar Energy Centre. The Ministry did not confirm whether this was being done though asked for by Audit.

Five **per cent** of the Solar cookers were to be inspected by the Ministry in the States where the number of solar cookers sold was upto 2000 and two **per cent** in the States where the sale was beyond 2000. The Ministry was to verify the facts regarding sale and use of solar cookers through correspondence with the users. Also the nodal agencies in the States were required to do the following **physical inspections** of the solar cookers:

Marketing agency/dealer	:	100 **per cent** of the solar cookers sold.
District level officer	:	5 to 10 **per cent** of the cookers sold.
State level officer	:	1 to 5 **per cent** of the cookers sold.

No report on such inspections either by the nodal agencies or the Ministry official was available in the records of the Ministry.

During 1991-92, the Ministry sanctioned 1500 **demonstrations** under Live Solar Cooker Programme and provided grants-in-aid of Rs 4.50 lakhs to the nodal agencies. Similarly, grants-in-aid amounting to Rs 2.46 lakhs were given to the nodal agencies for organising 241 **training programmes** for the users and artisans. There was nothing on record

to show that the above programmes were initiated leading to desired awareness among the rural masses.

Important audit findings in respect of this application are as under:

(i) Family cookers

In test check conducted by Audit in 11 States it was noticed that there was a substantial difference between the sale figures given by the States and those available at the Ministry, as shown below, resulting in payment of excess subsidy of Rs 40.08 lakhs during 1986-92:

Solar cookers sold

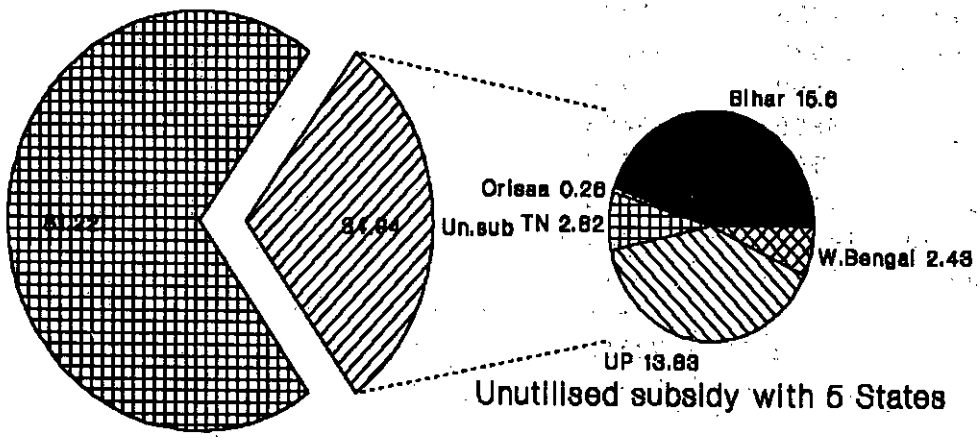
State	State's figures	Ministry's figures	Difference
Andhra Pradesh	1917	706	(-) 1211
Bihar	372	Nil	(-) 372
Haryana	8949	8795	(-) 154
Madhya Pradesh	82725	71977	(-) 10748
Maharashtra	11087	34588	(+) 23501
Orissa	797	769	(-) 28
Punjab	5880	6468	(+) 588
Rajasthan	20103	25389	(+) 5286
Tamilnadu	1124	1304	(+) 180
Utter Pradesh	14405	21296	(+) 6891
West Bengal	1913	2271	(+) 358
	149272	173563	(+) 24291

The Ministry stated in March 1993 that sometimes more than one system are installed under a project at one site or sometimes State agencies record one project while the Ministry records four systems and vice versa. The Ministry also added that it may happen that State agency/manufacturer has sold solar cookers without claiming subsidy from the Ministry. The Ministry had not specifically indicated the reasons for the difference in these figures.

It was also observed that subsidy upto 1991-92 released by the Ministry and by the State Governments to the nodal agencies in some States, remained unutilised (March 1992) as shown below:

	Subsidy released	Subsidy unutilised
	(Rs in lakhs)	
Orissa	1.5	0.26
Uttar Pradesh	21.58	13.83
West Bengal	14.22	2.43
Tamil Nadu	11.74	2.82
Bihar	32.18	15.60
Total	81.22	34.94

Unutilised Subsidy (Solar Cooker) (Rs in lakhs)



No information was made available to confirm whether the above unutilised subsidy was refunded to the Ministry/ States or adjusted in subsequent years.

There had been no sale of solar cookers in the States of Assam, Arunachal Pradesh, Jammu and Kashmir, Karnataka, Nagaland, Tripura and in Pondicherry till 31st March 1992. According to the Ministry (March 1993), sales were reported in Karnataka but Audit obtained facts of no sale in Karnataka from the Ministry's records of July 1992. Sale had been very negligible, ranging from 20 to 200 units, in the States of Kerala, Manipur, Mizoram and Sikkim and the Union Territories of Andaman and Nicobar Islands and Dadar and Nagar Haveli. Negligible sales were attributed (March 1993) by the Ministry to non existance of any local solar cooker manufacturer and excessive transportation costs in case of small orders placed on manufacturers located in other States.

(ii) Community solar cookers

Details of sale/subsidy paid in respect of community solar cookers were not made available in any State except Punjab and Madhya Pradesh where 50 and 1060 community solar cookers respectively were sold during 1986-92.

The Ministry stated (March 1993) that due to poor response of the users, community solar cookers have been withdrawn from the Solar Cooker Programme. It did not find acceptability owing to its size and associated handling problems.

(iii) Free distribution of solar cookers

In West Bengal, 1774 solar cookers valued at Rs 13.77 lakhs were given free to beneficiaries. Out of the 1774 cookers distributed free, 284 were distributed by Forest Department and remaining 1490 under Integrated Rural Energy Planning Programme. It was reported by the Department of Development and Planning of the State Government that **beneficiaries were using them as box and mirror** and no awareness for proper use of solar cookers was generated among the villagers.

iv) Other interesting points

(a) In Uttar Pradesh, sales remained confined to the urban areas whereas the main object was to reach to the rural people.

(b) In Madhya Pradesh, there was closing stock of 3675 solar cookers as on 31st March 1992 which included 1095 irrepairable cookers worth Rs 8.42 lakhs which were

proposed for write off without analysing the reasons and fixing any responsibility by regional offices.

(c) Project on "Indigenous Development of Community Solar Cookers" was sanctioned to a firm in Bombay in March 1990 for Rs 5.80 lakhs for one year with the objective of developing indigenous community solar cooker despite adverse comments of the experts on the high cost, inflated budget and extent of user acceptance. Performance reports had not been received.

F. Solar Water Heating System

(i) The programme of providing subsidy for solar water heating system aims at promoting installation of such systems at such locations in the Public and Private Sector which need large quantities of hot water so as to effect complete or partial replacement of conventional fuels. Subsidy is also provided to users for domestic hot water systems. Achievements in respect of solar water heating system upto 31st March 1992 (Statewise) was as follows (targets for the same could not be furnished by the Ministry):

State	Commerical/Industrial	Domestic
Andhra Pradesh	122	118
Assam	46	-
Arunachal Pradesh	67	-
Andaman Nicobar	18	-
Bihar	51	-
Chandigarh	74	19
Delhi	468	872
Goa	41	2
Gujarat	1461	4863
Haryana	130	33
H.P.	125	779
J&K	72	42
Karnataka	160	1074
Kerala	40	24
Manipur	24	12
Meghalaya	44	2
Maharashtra	217	223
M.P.	252	50
Mizoram	1	-
Nagaland	13	-
Punjab	185	235
Orissa	95	-

Rajasthan	198	20
Sikkim	24	9
Tamilnadu	229	1493
Tripura	4	-
Uttar Pradesh	550	255
West Bengal	74	1
Pondicherry	20	-
Dadra Nagar Haveli	3	-
Others	21	-
Total	4829	10126

Out of the eleven States test checked by Audit, in respect of which information on targets was available, in nine States targets had not been achieved.

(ii) Systems not functioning

It was seen in test check that solar thermal systems installed were, in many cases, not functioning properly due to technical malfunctioning, wrong site selection, non-maintenance, non-availability of water etc.

In Punjab, out of 72 projects in respect of which information was collected by Audit, 37 systems were found not working. Similarly in U P , out of 42 systems inspected, 27 were found to have been defective for considerable period of time. In Haryana, five solar water heaters costing Rs 3.81 lakhs and two solar water heater systems costing Rs 14.25 lakhs were not working since August 1986 and December 1985 respectively.

In Civil Hospital, Faizabad (UP), a solar water heating system of 6000 litres per day capacity was installed in 1986 at a cost of Rs 3.05 lakhs with 100 **per cent** subsidy but since then the system lay idle as it was not commissioned because the water supply was not available. While conducting survey for selection of the area, the State nodal agency had not ascertained continuous availability of water.

The Ministry stated (March 1993) that in an independant survey conducted to evaluate the performance of these systems, about 70 **per cent** were found to be working. The reasons for 30 **per cent** of the systems to be not working was forced circulation (pump) of water in the

system. It was expected that with the introduction of thermo syphon design upto system capacity of 5000 lpd, most of the problems would be solved.

In UP, according to the nodal agency, lack of interest on the part of users for operation and upkeep of these systems especially where these have been installed under heavily subsidised rate has resulted in their non-functioning and adverse publicity about solar thermal technology.

(iii) Non-adherence to norms for prioritisation

According to the guidelines of the Ministry, priority is to be given to projects with least central subsidy. Further, projects were also to be taken up in tribal areas and other areas with SC and ST population.

In Maharashtra, norms as fixed by the Ministry in respect of priority projects were not adhered to. In Pondicherry, solar water heater systems were installed mostly in Government offices (63 **per cent**) and in educational institutions (20 per cent). In Madhya Pradesh, 44 solar water heater systems were installed without approval of the Ministry. In Rajasthan, no such priority project was selected during 1991-92. In Uttar Pradesh also, no norms were adhered to in respect of installation of systems in priority projects. Out of 507 solar water heater systems, 323 systems (64 **per cent**) costing Rs 161.50 lakhs were installed in Government offices/ residences of high officials and factories, free of cost, for demonstration, while Rs 92 lakhs were spent for individual use.

(iv) Infructuous release of grants or subsidy

In Andhra Pradesh, during 1990-91, the nodal agency obtained sanctions from the Ministry for 35 systems (industrial) with an aggregate capacity of 119,700 litres per day (lpd). The Ministry released Rs 30.42 lakhs in 1991 towards subsidy for these systems. Against the above sanction, the nodal agency had so far (August 1992) installed 12 systems with an aggregate capacity of 32000 lpd. In three cases involving Rs 12.78 lakhs of subsidy from the Ministry, consent of beneficiaries is yet to be obtained. In one case involving Rs 2.63 lakhs, actual requirement of beneficiary is yet to be assessed and in two cases involving Rs 3.12 lakhs the beneficiaries' contribution is yet to be received.

In Karnataka, in March 1992, the Ministry sanctioned a subsidy of Rs 2.49 lakhs for 83 cases of domestic water heaters on the basis of proposals sent by manufacturer though the nodal agency had not included those cases in its recommendation.

In Rajasthan, during the years 1987-88, 1988-89, 1989-90 and 1991-92, 28, 21, 23 and 22 solar water heating systems of 0.11 lakh, 0.12 lakh, 0.10 lakh and 0.21 lakh litres per day capacity respectively were installed without obtaining approval of the Ministry. Subsidy amounting to Rs 16.57 lakhs was allowed to the beneficiaries out of unspent amount of non-installed systems duly approved by the Ministry. Reasons for not obtaining approval of the Ministry for diversion of subsidy amount and non-installation of approved systems were not furnished.

In Punjab, it was noticed that 490 solar water heater systems were sanctioned by the Ministry during 1987-91 against which advance subsidy amounting to Rs 67.94 lakhs representing 85 **per cent** of the cost of the systems was released. Subsequently 279 systems were dropped due to the beneficiaries not depositing their share. The advance subsidy had been released by the Ministry to the nodal agency in respect of 279 systems amounting to Rs 28.12 lakhs which had not been installed. It was also noticed that in 15 systems manufactured/installed, three manufacturers/ suppliers were paid 75 **per cent** of the total cost of the projects on receipt of the materials at site against the admissible payment of 60 **per cent**. The terms and conditions of payments to manufacturers/suppliers as laid down by the Ministry were not followed while tendering/obtaining supplies resulting in undue financial aid of Rs 4.74 lakhs to the manufacturers/suppliers for periods ranging between one year and two years.

G. Solar Timber Kiln

For seasoning of wood, big timber industries generally use steam heated timber seasoning kiln. The substantial energy requirement of this kiln comes from conventional energy sources like coal, oil and electricity. As an alternative to this system, Solar Timber Seasoning Kiln was developed and put to use. Achievements in States where solar timber kilns had been installed upto 31st March 1992 was as follows:

State	Number of Solar Timber Kiln installed
Andhra Pradesh	2
Arunachal Pradesh	1
Chandigarh	1
Delhi	4
Gujarat	17
Haryana	1
H.P.	3
Karnataka	2
M.P.	1
Punjab	6
Uttar Pradesh	32
West Bengal	1
Total	71

Targets for the above could not be furnished by the Ministry. In respect of three States (Karnataka, Maharashtra and Punjab) test checked by Audit, where targets had been set, there were shortfalls in achievement ranging between 17 to 100 **per cent.**

H. Solar stills/Desalination

These are used for distilling water thereby removing salts from saline water. Such units are useful in providing potable water in problem villages and for supplying distilled water for use in batteries in remote and interior places. Achievements in States where solar stills had been installed upto 31st March 1992 was as follows:

State	Number of Solar stills installed
1. Andhra Pradesh	486
2. Assam	56
3. Arunachal Pradesh	53
4. Chandigarh	55
5. Delhi	1643
6. Gujarat	5300
7. Haryana	120
8. Himachal Pradesh	3
9. J&K	70
10. Kerala	10
11. Manipur	21

12.	Maharashtra	145
13.	Madhya Pradesh	150
14.	Punjab	104
15.	Orissa	398
16.	Tamilnadu	1
17.	Tripura	25
18.	Uttar Pradesh	586
19.	West Bengal	75
20.	Pondicherry	20
21.	Dadra Nagar Haveli	2
22.	Lakshadweep	328
	Total	9651

Targets for the above could not be furnished by the Ministry.

In six States test checked in audit, in respect of which targets were available, in five States (Maharshtra, Karnataka, Orissa, Pondicherry, West bengal) there were shortfalls in achievement to the extent of 21 to 100 **per cent**.

I. Solar Air Heater

Solar air heater can be used both for agricultural applications such as drying of grains, tea, copra and tobacco as also for industries such as textiles, timber etc. Achievements in States where solar air heaters had been installed upto 31st March 1992 was as follows:

State	Number of air heaters installed
Andhra Pradesh	2
Assam	3
Arunachal Pradesh	1
Delhi	1
Gujarat	9
Himachal Pradesh	2
Karnataka	1
Kerala	2
Madhya Pradesh	2
Punjab	1
Orissa	2
Tamilnadu	3
Uttar Pradesh	27

West Bengal	5
Total	61

Targets for the above could not be furnished by the Ministry. In three States (Karnataka, Maharashtra, West Bengal) test checked in audit, in respect of which targets had been fixed, targets had not been met.

J. Other miscellaneous applications

In Uttar Pradesh, three small SPV power plants went out of order due to non-maintenance after installation, resulting in infructuous expenditure of Rs 12.26 lakhs. In Karnataka, the Ministry sanctioned, in June 1988, a 10 - tonne solar frozen storage unit with a capital outlay of Rs 8.70 lakhs. The system was installed and commissioned in February 1990 at a cost of Rs 6.20 lakhs but could not be successfully operated because of certain snags which had not been rectified. The expenditure of Rs 6.20 lakhs on the project (August 1992) had not yielded the intended result.

5.2 Injudicious release of funds

The Ministry (a Department upto July 1992) invited, in October 1987, proposals, for financial assistance as grants, from various State Electricity Boards on cost sharing basis for development of micro-hydel system and large scale exploitation of energy from micro and mini hydel resources. In response, Punjab State Electricity Board (PSEB) proposed (November 1987) installation of four mini hydel systems viz Channowal and Gholia in Abohar and Sidhana in Bhatinda and Sahoke in Kotla.

Of the above, Research and Development (R&D) Committee (of the Ministry) on mini-hydel approved (February 1988) two projects viz Gholia of 2 x 325 KW and Sahoke of 2 x 300 KW at an estimated cost of Rs 231.51 lakhs and Rs 221.10 lakhs respectively. Cost of civil works was to be borne by PSEB. Assistance of the Ministry for these two projects was Rs 128.94 lakhs for Gholia and Rs 120.89 lakhs for Sahoke. The pattern of assistance for different projects and the manner in which the estimated cost was worked out were not mentioned in the records made available to Audit.

Sanction was issued by the Ministry in March 1988 with the condition that the grantee organisation will be required to furnish progress reports, the first by 30th June 1988 and thereafter quarterly, on all aspects of the project. The duration of the projects was 18 months from the date of issue of the sanction. The Ministry released Rs 40 lakhs (Rs 20 lakhs for each project) in favour of PSEB in March 1988.

In May 1988, the R & D Committee (RDC) recommended that capital cost of mini hydel projects may be restricted to Rs 0.25 lakh per KW of the installed capacity against their recommended cost of Rs 0.30 lakh to Rs 0.35 lakh per KW. RDC also recommended undertaking other two hydel projects at Sidhana and Channowal of 2 x 325 KW each which had been proposed by PSEB in November 1987. The projects were sanctioned in March 1989 at a total cost of Rs 162.50 lakhs each. The Ministry released Rs 42 lakhs (Rs 21 lakhs for each project) in March 1989. Further ad-hoc release of Rs 175 lakhs was made in March 1989 to meet expenditure on all the four projects during the financial year 1988-89, without any request from the State Government or the PSEB. Tenders for the projects were invited by PSEB in August 1989, December 1989 and September 1991. However, neither the contract was finalised nor any other work on the projects started.

PSEB informed the Ministry in October 1991 that they had decided that the projects might not be taken up as (a) cost of generation was very high and capital cost was Rs 405 lakhs per MW and (b) a token provision of Rs 100 lakhs was only made for development of mini hydel projects in the eighth plan of Punjab. On Audit pointing out the matter (October 1991) the Ministry cancelled these projects in January 1992 and directed PSEB to refund Rs 257 lakhs alongwith interest as the funds could not be utilised for the purpose for which they were intended. The Ministry intimated (December 1992) that the Punjab Government had refunded the entire amount of Rs 257 lakhs in September 1992. No interest was paid by PSEB, which @12 **per cent** would work out to Rs 122.74 lakhs.

The funds were thus released on adhoc basis without even obtaining progress reports. Even though the first two projects were delayed, funds beyond the first instalment were released for two more projects. Further, though PSEB had not asked for funds,the Ministry on their own asked them whether they would be able to spend the money

for four projects, in lieu of two already sanctioned, and released the amount. The Ministry's contention (February 1993) that the funds were released after obtaining PSEB's confirmation does not clarify why without detailed scrutiny of the projects the funds were released. Had proper care been taken in the release of funds, idling of at least Rs 175 lakhs of the Rs 257 lakhs that had idled for over three years could have been avoided.

5.3 Follow up on Audit Reports

The Lok Sabha Secretariate issued instructions (April 1982) to all the Ministries requesting them to furnish notes indicating remedial/corrective action taken by them to the Ministry of Finance (Department of Expenditure) on the various paragraphs contained in the Audit Reports of the Comptroller and Auditor General of India as soon as they were presented to the Parliament. Such notes were required to be submitted even for paragraphs which were not selected by the Public Accounts Committee for detailed examination.

A review of the 'Action Taken Notes' on the observations of Audit contained in the Reports for the last five year's revealed that the Ministry has not submitted (March 1993) such notes on the following paras:

Audit Report Number and Year	Para No	Caption
No.2 of 1991	3	Magneto Hydro Dynamics Research Project
No.2 of 1992	2.1	Follow up on Accounts
No.2 of 1992	2.2	Non-installation of Solar Dryers
No.2 of 1992	2.3	Technical failure in designing and executing a project
No.2 of 1992	2.4	Inadequate monitoring of feasibility pilot plant study
No.2 of 1992	2.5	Non demonstration of solar thermal pumps

CHAPTER VI

Department of Ocean Development

6.1 Infructuous expenditure

Department of Ocean Development sanctioned, in March 1986, a pilot project on prawn hatchery to the Central Institute of Fisheries Education (CIFE), a CSIR institute, with financial assistance of Rs 15.62 lakhs for duration of three years. The Department released Rs 8.91 lakhs in three instalments i.e. Rs 5 lakhs in March 1986, Rs 2.18 lakhs in May 1989 and Rs 1.73 lakhs in March 1990. The objectives of the project were to develop sound technological footing for mass scale breeding and larvel rearing of Penacia prawns in brackish water. The important components of the project were training, extension of technology and operation and demonstration in the field.

The work on the project, sanctioned in March 1986, was initiated in February 1987. Delay in commencement was attributed to administrative difficulties.

One of the major approved equipment costing Rs 3 lakhs, required in the second year of the project, was not purchased till the project was terminated although additional funds of Rs 2.18 lakhs were also sanctioned by the Department in May 1989 as the cost of the equipment had gone up to Rs 5.18 lakhs due to delay in completing the import formalities. Reasons for not procuring the equipment were not available from the records.

CIFE submitted three progress reports of the project of which two were reviewed by the experts. While in the first report (January 1989), the work done on the project was found satisfactory and encouraging, the expert commented that (a) there was considerable time gap between date of sanction ((March 1986) and date of implementation (February 1987) and that (b) constraints of water quality should have been foreseen. The expert desired to know the remedial course for it. The comments were conveyed to the Principal Investigator in February 1989 who did not respond.

Review of the project by the Department in June 1990 revealed (i) large variation in all the objectives without any basis (ii) feeding preference, transport and

survival of breeders, feed formulation testing and growing/flattening of feed organism were far from prescribed standards and (iii) progress made even after four years was scratchy and far from satisfactory. The project was terminated in July 1990.

The Department did not monitor the project closely. Had it done so , the delay in commencement of the project and other problems would have come to its notice much earlier and remedial measures undertaken. As a result the investment of Rs 8.91 lakhs on the project did not yield any benefit.

Accepting the facts the Department stated (December 1992) that the Institute has submitted a final report outlining "modalities of set up a completely indigenous technique of seed production."

6.2 Unfruitful expenditure

In November 1989, the Department of Ocean Development approved the proposal of National Geophysical Research Institute (NGRI) for research in Advanced Raman and Photoluminescence spectroscopic facility for Oceanic and Mineral Physics. The total cost of the project was Rs 87.50 lakhs of which Rs 36.00 lakhs was to be funded by NGRI. The balance of Rs 51.50 lakhs was to be funded by the Department which was released to NGRI in two instalments in November 1989 and October 1990. The project duration was for two years. Out of the Department's funds, equipment worth Rs 18.40 lakhs were procured for the project during 1989-90 and 1990-91.

In November 1990, the Project Investigator resigned from the Institute. The Department decided (March 1991) that as an equally suitable replacement was not available, the project should be foreclosed. NGRI refunded to the Department the unutilised funds of Rs 33.10 lakhs in October 1991.

The equipment procured at a cost of Rs 18.40 lakhs have remained unutilised. These have also not been transferred elsewhere (October 1992) though the Department had stated (July 1992) that these would be utilised elsewhere in the country for research projects funded by them. In December 1992, the Department intimated that the equipment were needed by the Mineral Physics Laboratory of NGRI and they had, therefore,

permitted the latter to keep the equipment as custodian of Department's property until an alternative use for the same was found.

Thus substantial investment on procurement of the equipment did not yield the desired results.

CHAPTER VII

Department of Science and Technology

7.1 Indian Association for the Cultivation of Science - audit review

7.1.1 Introduction

Indian Association for the Cultivation of Science (IACS) was established in Calcutta in July 1876 as a registered Society under the Societies Registration Act of 1860 and is supported by the Department of Science and Technology (DST). The objectives of IACS are to :

- cultivate Science in all its departments both with a view to its advancement by original research and to its varied applications to the arts and comforts of life.

- found, equip and maintain scientific laboratories and library or reading room for general use among the members or the students of the Association.

- establish and maintain collections of Natural History, Mechanical, Scientific and Philosophical inventions, instruments or designs.

- take all proper and necessary steps for diffusion and cultivation of Science in all departments.

7.1.2 Scope of audit

IACS is audited under Section 14 of the Comptroller and Auditor General of India (Duties, Powers and Conditions of Service) Act 1971. The functioning of IACS for the period from 1985-86 to 1991-92 was examined in audit and the main findings are set out in the succeeding paragraphs. The draft review was sent to DST in September 1992; their response is awaited (March 1993).

7.1.3 Organisational set up

The affairs of IACS are administered, directed and controlled, subject to Regulations, Bye-laws and Orders by a Council which is its executive authority. The office bearers and members of the Council are elected according to the Bye-laws. The Council has fourteen members

including the President. Tenure of the office bearers or a member is for three terms with the period from one Annual General Meeting to the next counted as one term. Seven members form quorum for the Council. The Council which should ordinarily have four meetings every year in the months of March, June, September and December, met only 21 times in a period of 7 years i.e. 1985-92.

The Annual General Meeting of IACS, ordinarily to be held in the month of July every year, had not been held since 1982 consequent on a court injunction. No election to the Council, the decision making body of IACS, had taken place since then.

7.1.4 Finance and Accounts

Though the Regulations and the Byelaws of IACS provide for accepting donations and borrowing money besides receiving grants-in-aid from Government, it is mainly financed from out of grants received from the Department of Science and Technology and the Government of West Bengal. Other receipts include subscription from members, sale proceeds of journals and other miscellaneous receipts. Total recurring and non-recurring grants received from Central and State Governments under plan and non-plan heads vis-a-vis income of IACS from other sources and expenditure thereof is given in the following table:

Year	Grants		Other receipts	Receipts on Project Account	Total Receipts	Total Expenditure
	Government of India	State Government				
	(Rupees in lakhs)					
1985-86	186.00	31.82	90.64	69.38	377.84	379.45
1986-87	224.00	35.85	74.34	56.86	391.05	379.60
1987-88	224.00	40.51	107.12	49.00	420.63	443.57
1988-89	264.50	59.12	173.09	94.39	591.10	583.20
1989-90	280.00	67.04	106.54	34.50	488.08	491.97
1990-91	389.00	97.96	109.29	5.00	601.25	570.21
1991-92	380.00	47.28	122.55	--	549.83	552.23

7.1.5 Research activities

The research in IACS is carried through 11 department/units, in broad areas of Physics and Chemistry, concentrating on fundamental research or

applications of national importance. IACS has a board of faculty for each department/unit to plan and conduct research and other academic activitiies of the the department and to review and discuss reports on research work. Academic Board is entrusted with functions of planning and conducting research and other activities and to receive and discuss periodically reports of all research work from heads of the departments. It also considers and submits to the Council, an Annual Report of the activities of the various departments of IACS. In practice, however, the departmental board does not report results of research to the Academic Board. IACS stated in April 1992 that since the Association was engaged in research in frontal areas of science, the inputs derived from personal faculties of the core research group for doing research work, in a particular problem , is never questioned. The associated problems in executing research work which invariably arose were discussed in the meeting of the faculty board, which needed intervention from administration at the departmental head level or at the Academic Board level, though these were not minuted. In the absence of any recorded minutes, the efficacy of the system stated by IACS in monitoring of the research work, could not be verified by Audit.

Progress and quality of research is measured in terms of research papers published in the scientific journals in India and abroad, number of students obtaining Ph.D. doing their research in IACS, and papers read in various conferences in the country and outside. There was no mechanism to evaluate the standard of such publications. IACS however furnished a list of journals in which their research papers were published during 1985-92 alongwith the ranking of the journals as per Science Citation Index (SCI) Journal Citation Reports ranked by impact factors (1985).

IACS stated (June 1992) that it did not have any special cell to evaluate publication by the scientists nor was any department in IACS equipped with such manpower as would evaluate the publications. It was stated that steps would be taken to plan and organise such cell in course of time, subject to availability of funds for creation of manpower for this purpose.

7.1.6 Endowment funds

IACS has a large number of endowment funds instituted for endowment lectures and visiting professorship. These

funds have been created out of donations from public. Details showing corpus, balance on the date of amalgamation (May 1991) and expenditure incurred during 1985-91 in respect of fourteen endowments as detailed below:

Name of the Fund	Initial corpus	Balance as on 31-5-91	Expenditure during 1985-91
		(Rs in lakhs)	
1. Mahendra Lal Sircar Professorship Fund	1.49	4.28	1.56
2. Vehari Lal Mitra Fund	1.32	4.49	1.26
3. Ripon Professorship Fund	0.21	1.01	0.11
4. Hare Professorship Fund	0.02	0.10	Nil
5. Cooch Bihar Professorship Fund	0.33	1.24	0.08
6. Victoria Professorship Fund	0.02	0.10	Nil
7. Joy Kissan Mukhjee Gold Medal Fund	0.05	0.53	0.03
8. Bimala Charan Law Gold Medal Fund	0.07	0.29	Nil
9. Dr Sircal Research Medal Fund	0.05	0.35	Nil
10. Woodburn Medal Fund	0.02	0.09	Nil
11. Jatindra Charan Prize Fund	0.01	0.06	Nil
12. Nikunja Garabini Prize Fund	0.01	0.06	Nil

13. Meghnad Saha Memorial Fund	Nil	0.72	0.90
14. Prof.Santi Ranjan Palit Memorial Fund	0.60	0.77	Nil
Total	4.20	14.09	3.94

Thus, there was no expenditure during the years 1985-91 in respect of as many as eight out of fourteen funds to meet the aspiration of donors. Against the initial corpus of Rs 4.20 lakhs, IACS created (May 1991) a IACS Research endowment fund of Rs 14.09 lakhs amalgamating various endowment accounts into a common fund maintaining individual identity of each endowment. IACS stated (December 1992) that with the amalgamation of endowment funds in May 1991, they were now trying to hold various endowment lectures as per resolution of the Council and meet the expenditure out of the interest accrued on the total investment.

7.1.7 Review Committee

DST appointed, in June 1983, a Review Committee to review the activities of the Association taking into account the expansion and improvements since the last review in 1968; to report on the manner in which Central government grants were utilised; to consider how the organisation and administrative structure served the aims and objectives of the Research Institute; to review the quality and quantity of work done; to assess the value of work in relation to the objectives; to suggest new thrust areas of research for the next ten years, and to advise generally on any matters for further development.

The review committee considered the matter of general administration and management of IACS and observed that the relationship between the General Body and the Research Institute had not been entirely effective and beneficial. The Committee recommended:

- Department of Science and Technology which was to provide most of the funds should take action to delink the General Body from its management and policy making role.

- Research programmes needed to be examined from time to time to ensure that efforts were mainly in front line areas of Physics and Chemistry and some important inter disciplinary or goal oriented areas. For this purpose Research Advisory Committee (RAC) with three members should be nominated by DST.

- Planning and coordination of Physics and Chemistry divisions should be done by the Dean of these divisions. It should be considered whether IACS could become an institution of national importance.

IACS intimated (December 1992) that though the Council took initiative in the matter of structural changes in IACS in June 1985, some life members of the Assoication brought an injunction from a court of law and the case was still pending . As regards RAC, it was informed that the expert committee has been reconstituted and further action would follow. The decision of appointment of Deans could also not be implemented.

7.1.8 Other points of interest

(a) The staff (technical and administrative) were allowed revised pay scales with benefits at par with Central Government employees, and the academic staff were given pay scale and allowances admissible to equivalent posts in the central universities. However, employees of IACS continue to get certain benefits not admissible to those in the Central Government or the central universities. Such instances are discussed below :

(i) Five day week

IACS had a five day week working schedule but the working hours were not changed to absorb loss of working hours. The matter reportedly was discussed in the Council meeting but no decision to increase the working hours had been taken so far (June 1992).

(ii) Deviation from standard promotion rules

Rules relating to promotion of staff of category 'B' of IACS provide for giving higher scales of pay after rendering certain length of service without allowing

designations straightway so that the number of posts in a level (as per designation) do not exceed the sanctioned strength. IACS had been promoting staff giving them certain designations straightway. As a result, the number of staff holding a particular designation exceeded the number of sanctioned posts in that cadre. The excess staff was accommodated by creating supernumerary posts which was not in order as per the regulation, it was applicable for outstanding scientists only. The Council of IACS was not empowered to create such posts. Thus the concept of sanctioned posts had become irrelevant in the IACS.

Further, the Council of IACS in its resolution dated 28th April 1989 approved, in violation of its regulation and bye laws, creation of supernumerary posts for absorption of consolidated and daily rated workers of IACS with the stipulation that the posts so created were to be abolished by adjustment against future vacancies on retirement, resignation etc. Accordingly 30 personnel who worked on consolidated pay and daily rates were appointed in different posts effective from 1st June 1989. This was in violation of regulation and byelaws of IACS.

(iii) Department of Science and Technology had requested IACS in December 1984 for insertion of a clause in the Bye laws relating to the structure of emoluments i.e. adoption of pay scale, allowances, and revision thereof and that the creation of posts above a specified level would need prior approval of Government of India in consultation with the Ministry of Finance, Department of Expenditure in terms of their OM dated 16th March 1985. No action had been taken so far (June 1992). IACS stated (May 1992) that this suggestion would be taken care of as soon as the general body is allowed to meet. It also stated that the posts which were created by the Council were in the revised scale and as the corresponding revised maximum for obtaining approval was not known to IACS, the Council's approval was taken as absolute.

(b) Irregular granting of increment

Other conditions remaining the same, in cases when basic pay of a junior employee becomes more than that of his senior, the basic pay of the senior employee is to be raised to remove the anomaly provided both the employees are in the same cadre. Similar provision also exists in IACS. However, instances of raising of pay with reference to pay of junior employee belonging to

different cadre were noticed viz., antedating on 21st June 1984 in respect of 19 employees, on 13th May 1985 for six employees, and on 3rd July 1986 for 17 employees. There were cases when one employee had the benefit of antedating his date of increment on two occasions because of the involvement of more than one cadre on the same pay scale. IACS stated (December 1992) that these cases were approved on the basis of recommendation of the grievance redressal committee of the Association. The argument is not acceptable as the antedatating was done in contravention of the rules obtaining in the Association.

(c) Workshop

IACS maintains a workshop for fabrication, repair and maintenance of equipment required for its research activities. Scrutiny revealed that job cards were not maintained in the workshop till 1990-91. The job cards made available for jobs done during 1990-91 onwards also were not maintained properly in as much as they did not show the date of completion of the work.

IACS does not have any yardstick/norm for determination of the strength in different cadres of the workshop which had 42 personnel. No assessment was made of the output of the workshop and productivity of its personnel. No log books of equipments were maintained in the workshop. IACS stated (December 1992) that arithmatical commensuration was not the only criteria for a research organisation. Skill, time, energy, special design are also to be considered for retention of such a complement of work force in the workshop. That, however, does not absolve the IACS from evaluating the job done vis-a-vis the expenditure involved.

(d) Library

IACS library is a premier technical library in the eastern region with intensive collection of books. Expenditure incurred on the library books and journals vis-a-vis number of books and journals received for the period from 1985-92 are as follows:

Year	Books received	Journals/ serials subscribed	Expenditure incurred **(Rs in lakhs)**	Journals received through exchange
1985-86	227	311	9.47	142

1986-87	213	317	18.42	141
1987-88	128	311	26.95	129
1988-89	177	305	16.08	130
1989-90	105	304	17.98	130
1990-91	150	298	43.07	126
1991-92	127	280	71.37	122

IACS purchased various foreign journals, periodicals through Indian agents/publishsers. The price of the journals was paid in Indian rupees fixed at prevailing foreign exchange rate on the date of invoices. The conversion rate was valid for 60 days from the date of invoice, and in case, the payment was made beyond that period, the agent would claim additional amount for any upward revision in conversion rate of foreign currency applicable on the date of receipt of payment of original claim. IACS on receipt of the proforma bills from the respective agents, had placed orders for journals within a reasonable period of sixty days but could not make payments within the stipulated period (60 days). The delay in making payments ranged from 5 to 10 months and as a result the conversion rate of foreign currency went up and IACS had to incur an extra expenditure of Rs 5.64 lakhs during the year 1986 to 1991 on this account.

7.1.9 Internal Audit

IACS has the system of internal audit with one Audit Officer for periodical audit of different departments and submission of reports to the Director for taking remediel measures. However, it was not being done. IACS stated (December 1992) that a proposal for strengthening and stream-lining of the internal audit was under consideration.

7.1.10 In sum,

- Election to the Council has not taken place since 1982 and the same Council is continuing for all these years. The Council did not always meet as frequently as provided for in the Regulations and the Bye-laws.

- IACS does not have any mechanism to evaluate the standard of the publications by its scientists.

- No awards had been given from a number of endowment funds for many years.

- DST appointed a Review Committee to review the activities of IACS in June 1983. No action was taken on the major recommendations of this Committee viz. delinking of General Body from its management and policy making role, and establishment of a Research Advisory Committee (RAC).

- IACS implemented revised pay scales with benefits at par with the Central Government employees, but measures like five days a week and other holidays, retirement age of staff etc were not implemented.

- IACS had been promoting staff giving designations straight way. As a result number of staff holding a particular designation exceeded the number of sanctioned posts in a cadre.

The above observations were referred to DST for their comments in September 1992; their response is awaited (March 1993).

7.2 Short recovery on extra departmental works

Party No. 41(SC), Survey of India (SOI), Palghat had undertaken extra departmental works on behalf of other organisations and recovered cost of such works. The overall cost of extra departmental works involved application of party overhead charges as computed in terms of para 33 of Topography Hand Book Chapter II. It was observed that during the years 1987-90, the percentage of party overhead charges had been applied wrongly at a flat rate of 25 per cent instead of the correct percentage of 56, 46 and 27 respectively for the years 1987-88,1988-89 and 1989-90.

Application of lower percentage of party overhead charges resulted in short recovery of Rs 4.02 lakhs towards cost of extra departmental works.

SOI stated in December 1992 that recovery of Rs 2.99 lakhs had been made and efforts were being made to recover the balance amount.

The Department stated in February 1993 that the party overhead charges were calculated at a flat rate of 25 **per cent** inadvertently and the position of recovery of amount would be communicated to Audit in due course.

7.3 Non-realisation of results from socially relevant projects

Science and Society Division of the Department of Science and Technology (DST) had sanctioned funds for some projects under the scheme "Science and Technology Application for Weaker Sections" to certain private bodies. The projects had to be foreclosed when the work was found to be unsatisfactory. Injudicious sanction of projects and ineffective monitoring rendered the expenditure of Rs 10.82 lakhs infructuous as shown below :

i) The project "Dissemination of Sericulture Practice - Application of Science and Technology for Rural Weaker Section" was sanctioned to a voluntary agency in July 1989 for a duration of two years at a total cost of Rs 3.06 lakhs out of which a sum of Rs 2.00 lakhs was released in July 1989.

The objectives of the project were (a) to train educated unemployed women and qualified students in silk worm rearing so that they could eventually give directions and encouragement to mulberry cultivators alongside the field assistants and (b) to form a society of the unemployed women to facilitate taking of loans for the purpose of starting independent mulberry farming.

According to the conditions regulating release of grant, the grantee was to furnish progress report of work on the project by 31st December 1989 and 1990. These were not received by DST. The grantee was also not reminded to furnish these reports. In the Group Monitoring Workshop (GMW) held in October 1990, progress of the project was found to be very poor and the Principal Investigator (PI) was asked to seek scientific and technical advice for its proper implementation. However, the second instalment of Rs 0.50 lakh was released in March 1991. In the GMW held in August 1991, it was noticed that PI had not taken a serious view of the work and he could not make a presentation. It was, therefore, decided to terminate the project from 30th September 1991.

ii) The proposal entitled "Improvement and Development of Leather Training Technology for Harijan Beneficiaries of Village Mangroth" received from a private association (April 1985) was sent to five referees for comments in May 1985, out of which three had given adverse comments and had specifically stated that the project should not be financed by DST. It was decided in the meeting of Expert Committee held on 13th August 1985 that the proposal may be cleared if favourable comments were received from Central Leather Research Institute (CLRI). On receipt of comments from CLRI, the proposal was approved in August 1986. Out of the total approved cost of Rs 1.99 lakhs, payment of Rs 1.40 lakhs was released in August 1986.

The objectives of the project were (a) to create employment, (b) to improve the economic viability of the village shoe industry and (c) to improve the overall village economy by creating income for the village. The progress reports due to be received from the grantee on 31st December 1986 and 31st December 1987 as per terms and conditions of the grant, were not received by DST. The grantee was also not reminded to submit the report. In the GMW held in September 1988, the project work was not found to be satisfactory and it was decided that no extension may be given and the project was treated as closed in August 1988.

iii) The project "Simplified Tanning System for Adoption in Villages" was sanctioned to a private association at a cost of Rs 1.30 lakhs in July 1986, out of which a sum of Rs one lakh was released in July 1986. The objectives of the project were (a) to develop suitable chrome tanning techniques applicable to the village level, (b) to contribute to the overall progress of the economy of the village tanners and (c) dissemination of scientific knowledge and technical knowhow in the villages and create overall scientific awareness in the cross section of the population of the country. The progress report due to be received from the grantee on 31st December 1986 and 31st December 1987 as per terms and conditions of the grant, were not received nor was the grantee reminded to submit the report. The work of the project was not found satisfactory in the second GMW held in August 1987. On the basis of the verbal report presented at the meeting and discussions held at the Expert Committee Meeting in December 1987, it was decided that the project should be terminated from 31st

December 1987. The expenditure till December 1987 was Rs 1.17 lakhs.

iv) DST approved in September 1988 a project "A Training cum Demonstration Programme in Scientific Agricultural Practices and Modern Dairy Technologies in 25 villages in Rajasthan" under the guidance of the President of a voluntary organisation at a total cost of Rs 6.45 lakhs for a period of two years. A sum of Rs 4.35 lakhs was released as first instalment in September 1988. The objectives of the project were (a) to evaluate the extent to which the constraints in the agricultural production in rainfed areas were preventable with only farm management practices and (b) to suggest short term and long term remedial measures for the constraints in agricultural production in rainfed areas for solving the problem on permanent basis.

The progress reports due to be received from the grantee on 31st December 1988 and 1989, as per terms and conditions of the grant, were not received nor was the grantee reminded therefor. The progress of the project was reviewed in the GMW held at Bangalore in November 1989 and it was suggested that the project sites should be visited by officials from DST. The officials after visiting the project site (December 1989) concluded that the scheme was not operated in accordance with the intentions of DST and was not likely to yield desired results. Keeping this in view the Expert Committee on Science and Technology for women, in its meeting held in March 1990, recommended that the project should be discontinued from November 1989. DST did not initiate any action to take back the equipment costing Rs 1.52 lakhs acquired by the grantee out of the funds released.

v) The proposal of the project entitled "Scientific Awareness Programme; Popularisation Among Tribals" received from National Institute of Social Work and Social Sciences, Bhubaneswar in February 1989 was sent to three referees for comments. Out of three referees, two supported the proposal with modifications and the third one returned it with the remarks that he found it extremely difficult to recommend this proposal which was diffused and lacked scientific understanding. An officer of DST was asked to visit the Institute concerned to find out its capabilities to formulate Science and Technology popularisation programme. Despite the adverse report of this officer the project was approved in September 1989.

The project envisaged adoption of 200 villages of Phulbani District in Orissa for covering subject areas of environment, agriculture utility resources etc. It was sanctioned at a total cost of Rs 2.68 lakhs and a sum of Rs 1.40 lakhs was released in September 1989. In September 1990, it was felt that in the activities of the project there had been a deviation from the mainstream of social work activities of the Institute and progress and achievements of the project had been rather limited and not satisfactory. The project was closed prematurely in September 1990. The expenditure of Rs 1.40 lakhs was thus rendered infructuous because of wrong selection of agency for which DST had enough forewarning even at the time of sanction.

The matter was referred to the Ministry in September 1992, their response is awaited (March 1993) despite reminders.

7.4 Infructuous expenditure on research projects

The following projects sanctioned by the Department of Science and Technology (DST) had to be dropped for poor progress due to various reasons as detailed below:

i) The project "Development of Microprocesser based Geoscientific Instrumentation Module for Water Resources" was sanctioned by DST in January 1987 at a total cost of Rs 5.81 lakhs for a duration of one and half years. Payment of Rs 1.50 lakhs was also released to the Institute for costal and offshore Research, Visakhapatanam in January 1987. In March 1988 the Principal Investigator (PI) intimated the Department that owing to increasing time constraints, he would not be able to handle the project and requested to be relieved. The Monitoring Committee on Geoscientific Instruments decided to close the project and the Institute was requested in January 1989 to refund the balance money alongwith statement of expenditure and report, if any. No reply has yet been received by DST (August 1992).

ii) The project "Integrated Resources Surveys on Andaman and Nicobar Islands" was approved and Rs 4.00 lakhs were released by DST in March 1987. No progress report, statement of expenditure and utilisation certificate in respect of the grant was received from the grantee and the matter was taken up in May 1990 with the Principal

Investigator (PI) and Andhra University. No reply has been received by DST so far (August 1992).

iii) DST approved in March 1986 a research project on "Enhancement of Heat Transfer Via Turbulence Promotion with Inline Propellers" at a total estimated cost of Rs 2.11 lakhs for a period of three years. Out of the sanctioned grant, Rs 1.10 lakhs was released to the Indian Institute of Technology, Kanpur in March 1986 and Rs 0.65 lakh in June 1988.

The project was reviewed twice by the Review Committee (RC) of DST and it was found (December 1987) that the experimental work was very much behind schedule and there was no likelihood of completing setting up the facilities for the research work during the next six months. The committee was doubtful about the successful completion of the work. Despite a further sum of Rs 0.65 lakh was released in June 1988. During the review committee meeting held in August 1988, it was observed that PI had not been able to fabricate the experimental set up and therefore, stopping of further funding to the project was recommended. The project was finally terminated in December 1988 on the advice of the RC and Project Advisory Committee (PAC) on Chemical Engineering. The expenditure of Rs 1.18 lakhs incurred on the project did not yield any result.

The matter was referred to the Ministry in September 1992; their response was awaited (March 1993) despite reminder.

7.5 Excess release of funds

Technology Information, Forecasting and Assessment Council (TIFAC) was registered as a Society in February 1988 under the Department of Science and Technology (DST). The main objectives of the Council include generating technology forecasting and technology assessment documents in various areas of technologies and establishing an on-line, interactive, decentralised but materially accessible computer based technology information system on processes, products, markets and expert etc. involved with chosen technologies.

TIFAC is primarily financed with grants released by DST. The release of grants by DST were much in excess of the

expenditure as was evident from large closing balance at the end of each year.

The quantum of grants received, other receipts, expenditure incurred and balance in hand for the years from 1988-89 to 1991-92 were as under:

Year	Opening Balance	Grants-in-Aid	Interest and other receipts	Total funds available	Expen-diture	Balance of the year
			Rs in lakhs			
1988-89	-	35.00	-	35.00	9.04	25.96
1989-90	25.96	279.50	4.67	310.13	140.76	169.37
1990-91	169.37	205.00	15.53	389.90	146.11	243.79
1991-92	243.79	163.00	18.32	425.11	248.89	176.22

The cash balance was stated (February 1993) by the Ministry to have been invested in short term deposits in addition to keeping some amount required for current expenses in savings account. The Ministry did not give details of the amounts invested in short term deposits though asked for by Audit.

The Ministry stated (January-February 1993) that several organisations had evinced interest in certain subjects. TIFAC had made appropriate provision in their budget also. However, the studies were not finally carried out effecting economy. The Ministry added that balance of funds were kept in view while sanctioning and releasing funds. It was also stated that during 1991-92 the expenditure was Rs 2.49 crores against release of Rs 1.63 crores. The reply is not tenable based on facts available on records. Further, increased expenditure during a year does not justify release of excess funds during the earlier years when the expenditure was much less. The case is clearly indicative of inadequate monitoring of release of funds and relating such release to the needs of the grantee.

7.6 Idle equipment

India Metereological Department placed order for procurement of two crushers in July and October 1990 valued at Rs 4.90 lakhs through Director General, Supplies and Disposals (DGS&D).The crushers were required for crushing ferro silicon grade 80-90 per cent

Silicon into crystals used for production of Hydrogen gas.

The supplies were to be made within 8/10 weeks and 16/20 weeks respectively but, the crushers were finally received in July 1991 and September 1991 after several extensions in the dates of delivery. Some accessories were still required which were delivered in August 1992.

Housing these machines needed sheds for which administrative approval and financial sanction were issued to CPWD in December 1989. The machines could however be installed in the sheds only in August 1992 due to delay in construction of the sheds.

Machines could not be made operational even after installation as electrification work including laying appropriate cables etc had not been carried out (November 1992). The Department stated in November 1992 that a number of agencies were involved in completing this project and their work had to be coordinated which resulted in the delay.

Delay in receipt of the machines and their accessories and lack of preparation for making the machines operational on their receipt resulted in idling of equipment valued at Rs 4.90 lakhs. Besides the benefit of guarantee would also not be available having expired in the meanwhile (one year from the date of receipt).

7.7 Follow up on Audit Reports

The Lok Sabha Secretariate issued instructions (April 1982) to all the Ministries requesting them to furnish notes indicating remedial/corrective action taken by them to the Ministry of Finance (Department of Expenditure) on the various paragraphs contained in the Audit Reports to the Comptroller and Auditor General of India as soon as they were presented to the Parliament. Such notes were required to be submitted even for paragraphs which were not selected by the Public Accounts Committee for detailed examination.

A review of the 'Action Taken Notes' on the observations of Audit contained in the Reports for the last five year's revealed that the Ministry has not submitted (March 1993) such notes on the following paras:

Audit Report Number and Year	Para No.	Caption
1. No. 7 of 1989	44	Inadequate administrative backup for installation of an air-conditioning plant
2. No. 2 of 1991	9	Serial on astronomy
3. No. 2 of 1991	39	Expenditure on an incomplete project
4. No. 2 of 1992	5.1	Follow up on Accounts
5. No. 2 of 1992	5.3	Poor selection of agency to introduce nationally important technology.

CHAPTER VIII

Department of Space

8.1 Excess purchase of stores

Vikram Sarabhai Space Centre (VSSC), Department of Space procured materials during 1975 to 1982 for the Satellite Launch Vehicle (SLV) Project. Though the project was successfully completed by launching of SLV3 D1 flight in 1980 and D2 flight in 1983, 1200 items worth Rs 69.88 lakhs in the stores procured for the project remained unused in stock as non/slow moving items (July 1992).

A review of the stock cards of high value items revealed that there were more than 100 items of value exceeding Rs 10,000 each in the stock. Though there is provision in the stock card for recording the minimum and maximum order level, such information was not found recorded. Justification for procurement of these materials in quantities indicated in the stock card thus could not be verified. There were no issues in respect of 40 items worth Rs 22 lakhs for the last five years. Stock balance of 65 items was at levels over 50 **per cent** of the initial quantity procured and its value came to Rs 36.60 lakhs. Twenty three items worth Rs 7.60 lakhs procured for the project were kept in stores without any consumption. The items included materials like steel forgings, round head screws, anchor plate nuts, voltalef oil etc.

Physical verification of stock was last conducted in December 1987. The codal provisions on stock verification, prescribing periodical review of the stock materials to ascertain the slow moving and non-moving items and to explore the possibility of utilising them in other units of the Department or of final disposal etc. were not followed by the Department. As a result, materials worth Rs 69.88 lakhs remained unused and there is a possibility of loss to the Government on account of stores becoming obsolete due to their retention for over 10 to 15 years.

The Department stated in December 1992 that although two operational flights of SLV after completion of the developmental phase were originally envisaged, these were not pursued since all technology development objectives were fully accomplished during the developmental phase itself. This together with design and technology/process

changes, substitution by better material etc had resulted in excess stores. It was further stated that VSSC has now taken action with other units to ascertain their requirements of this material and there was a distinct possibility of using these items. It was not clear why such a review was delayed so far. Timely review could have avoided idling of these stores.

8.2 Procurement of titanium mesh anodes

Vikram Sarabhai Space Centre (VSSC), Thumba, Department of Space, decided, in March 1986, to augment production capacity of its Ammonium Perchlorate Experimental Plant (APEP) at Alwaye to 150 tonnes per annum by replacing the graphite substrata lead dioxide anode system in its cell house with triple oxide coated titanium mesh anodes to meet the increased demand of Ammonium Perchlorate required for use in solid motor propellant for the Polar Satellite Launch Vehicle.

VSSC placed an order in October 1986 on a Public Sector Undertaking (PSU) for supply of 200 triple oxide coated titanium mesh anodes at a total cost of Rs 10.14 lakhs though earlier in March 1986, similar work had been successfully executed by a firm 'A'. The order was cancelled in March 1987 anticipating delay in delivery schedule and the same was restored immediately on the PSU's assurance of completing the delivery by August 1987. Since PSU had not kept delivery schedule to meet the requirement of additional anodes for use during periodical recoating and maintenance of anodes in service, VSSC placed, in September 1987, a purchase order on the firm "A" for supply of 100 triple oxide coated titanium mesh anodes at a cost of Rs 7.20 lakhs. These were delivered in November 1987. Due to further delay in supply by the PSU, VSSC placed another purchase order in February 1988 on the same firm 'A' and obtained 100 titanium mesh anodes at a cost of Rs 7.20 lakhs in April 1988. The replacement of graphite anodes with titanium mesh anodes was completed during the period from December 1987 to May 1988.

In the mean time the PSU supplied 200 anodes in February 1988. These, however, did not qualify in the acceptance test of VSSC and a deduction of Rs 4 lakhs from the payment was agreed to for the defective triple oxide coating. VSSC placed an order on firm 'A' in February 1989 for coating of these defective mesh anodes at a cost of

Rs 2.96 lakhs. However coating was done only for 100 anodes ie the number actually required at a cost of Rs 1.55 lakhs.

The Department thus acquired 400 anodes against its requirement of 300 (which included 100 as standby). Of these 100 remained substandard and were not used. In the process there was avoidable expenditure of Rs 3.28 lakhs.

The Department stated (December 1992) that since the PSU had invested in the work and negotiated with VSSC with an assurance to deliver the anodes by August 1987, the orders were restored on them mainly to have an alternative source of supply and also due to the fact that replenishment would be inevitable. VSSC had stated (July 1992) that contract with the PSU was cancelled and then restored in order to pressurise them to come to terms so that money advanced could be recovered. The products supplied though slightly deficient in specifications were now acting as standby and there was no extra expenditure. The contention was not tenable as only 40 **per cent** of the value of the order was paid as advance which could have been adjusted even if the order for 100 anodes only had been restored. The contract also envisaged levy of liquidated damages or invoking risk purchase clause for delay in supply, which could have been invoked. Further, the uncoated anodes cannot be termed to be standby. This is apart from the fact that the 300 working anodes included a standby of 100.

Import of graphite rods were kept in abeyance in August 1987 due to the decision to switch over to titanium anodes. VSSC, however, placed a purchase order in September 1987 on a West German firm for supply of 500 graphite rods at a cost of DM 30500 (Rs 2.47 lakhs) considering the uncertainties in supply of titanium anodes by the PSU. These graphite rods, received in April 1988, remained unused as the same were no longer required due to conversion of the plant with titanium anodes.

The Department stated in December 1992 that the import of 500 graphite rods was to meet the contingencies of premature failure of the titanium anodes developed. The reply was not tenable as the titanium anodes were performing satisfactorily in the plant since 1986 and the plant was converted to one with titanium anodes. The capability of firm 'A' in supplying the titanium anodes within a short delivery period was established consequent on

successful completion of contracts entered into in March 1986. Hence the import in September 1987, of 500 graphite rods costing Rs 2.47 lakhs was avoidable.

CHAPTER IX

Department of Tele-communications

9.1 Unfruitful expenditure

The erstwhile Telecommunication Research Centre (TRC) Society, now merged with Centre for Development of Telematics (C-DOT), proposed, in April 1989, indigenously designing and developing of an Automatic Service Protection Equipment (ASPE) for automatic restoration of service by switching the traffic to a protection channel in the case of failure of a digital line section, to increase availability of overall digital line system. ASPE was to be designed to handle data rates upto 140 mega bytes employed generally in the long distance network. The project was to be completed in 12 months.

The job of indigenous design and development of ASPE was entrusted to a firm 'A' on the plea that their engineers had done some practical work in their laboratory. Once the design was realised and approved it was to be the combined technical property of the firm and TRC. However, TRC would be free to transfer the technology to other manufacturers for production. The proposal was approved in May 1989 at a cost of Rs 9.75 lakhs as detailed below:-

Rs 2.50 lakhs	-	On approval of the project
Rs 1.50 lakhs	-	On completion of component and instrument ordering
Rs 2.00 lakhs	-	On realisation of design on bread board model
Rs 2.25 lakhs	-	On supply of two terminals for field trial
Rs 1.50 lakhs	-	At the time of completion and field trial of the project.

An undertaking from the firm was also to be obtained to the effect that the project would be completed to the satisfaction of TRC. The first two instalments amounting to Rs 4.00 lakhs (Rs 2.50 lakhs in May 1989 and Rs 1.50 lakhs in August 1989) were paid to the firm without obtaining any undertaking. With the merger of TRC with C-DOT, with effect from 31st August 1989, it was the responsibility of the latter to watch development of ASPE.

The project was due to be completed with supply of terminals and field trials by May 1990. However, two terminals of ASPE were demonstrated by the firm at C-DOT's premises in February 1991. By that time there was a great change in configuration of APSE system in the world. Consequent to the fast change in technology the terminals were not found to be according to the changed requirement of the Department of Telecommunications. The firm demanded Rs 4.25 lakhs towards the third and fourth instalments. These were not released as not only the product developed had not been found suitable, but also the Department had not decided the quantum of work to be done for the field integration enhancement which could determine the amount payable.

C-DOT stated, in July 1992, that major time was spent in integrating higher speed switches as procurement time was very long. Evaluation on prototype model was conducted in laboratory. The quantum of work to be done for the field integration enhancement could not be decided as there had been major changes in application and requirement of the network not only in our country but throughout the world. A decision would be taken in due course to bring the project to acceptable and logical ending and also for the amount payable to the firm. Department of Telecommunications stated, in December 1992, that in view of the changed scenario because of fast developments taking place, provision of a separate ASP equipment is not necessary, which would imply that the work done so far would not be of use.

In sum, a project which was conceived in April 1989 and was to be completed within one year, was delayed and had lost its utility, as at the planning and conception stage the global shift from earlier hierarchy to developed one which had been on the anvil for quite some time was not taken note of. Thus an expenditure of Rs four lakhs had become infructuous apart from what C-DOT may decide to pay to the firm after evaluating their work. C-DOT which is the apex R&D centre in this field for development of State-of -the-art technology did not review the research project and advise in time against further development efforts in the field in view of the changes in technology.

CHAPTER X

Indian Council of Agricultural Research (Department of Agricultural Research and Education)

10.1 Acquisition of unsuitable land

An area of 20.83 acres of land was acquired by Sugarcane Breeding Institute,Coimbatore at a cost of Rs 1.11 lakhs during 1962-65 for establishing the Research Centre at Cannanore in 1962. The objective was to maintain,expand and evaluate world collection of sugarcane germ plasm and to test varieties for high rainfall coastal climate. One of the requirements was that the location should allow free drainage to avoid excessive or continuous water logging during rains.

In 1970, it was noticed that out of 20.83 acres nearly 11.78 acres remained waterlogged and fallow for most part of the year and the Research Centre was not able to conduct experiments there.

Though the water logging was noticed during 1970, a proposal to develop the low lying area was approved in October 1986 only. One of the suggestions of the Advisory and Improvement committee set up for suggesting development of low lying area was to construct drainage channel at a cost of Rs 1.85 lakhs. Construction of the channel has not yet been completed (December 1992).

The Management Committee of the Institute which visited the Research Centre,Cannanore in October 1990 felt that the cost of reclaiming the land would be prohibitive as there was no provision for draining the flooded water through connecting outlets, that the soil was not suitable for sugarcane cultivation due to low PH content of the sub soil and that the land was also not suitable for coconut cultivation. It was, therefore, decided to hand over the land in the low lying area to the Directorate of Rice Research, Hyderabad which declined the offer later (1991). The Management Committee then felt that Central Plantation Crops Research Institute and Central Inland Fisheries Institute, Barrackpore could be approached for coconut cultivation or fish culture which was not pursued. The Institute was not in a position to indicate whether soil test experiment was conducted on the land before its acquisition.

Though the Institute had stated (June 1991) that the construction of drainage channel at the cost of Rs 1.85 lakhs was not wasteful, the expenditure would prove wasteful due to the fact that there was no connecting outlet. Eventhough the Institute had stated that it had maintained and evaluated the sugarcane germ plasm very effectively, the quinquennial review team (1980-87) in its report stated that the Research Centre could not carry out the evaluation of the germplasm in an intensive manner for utilising the same in the breeding programmes to develop suitable commercial types for want of adequate space suitable for the purpose.

ICAR stated in August 1992 that 8 to 9 acres of the land could be brought under cultivation out of the total water logged area of 11.78 acres and the rest of the area would be taken for roads, bunds etc.

Thus the 11.78 acres of the land where water logging was noticed in 1970 remains unutilised so far (August 1992) without any effective action to either utilise it or dispose it of.

10.2 Inordinate delay in Frog-culture programme

Central Institute of Fresh Water Aquaculture (CIFA), Bhubaneswar, a constituent unit of Indian Council of Agricultural Research (ICAR), acquired (August 1986) 17.46 acres of land at Kalyani from the Government of West Bengal on lease basis at a cost of Rs 10.56 lakhs for establishing a frog farm complex with the necessary infrastructure for undertaking, inter alia, commercial culture of frogs.

In 1987-88 ICAR released Rs 40 lakhs to CIFA for completion of construction of laboratory-cum-office building, boundary wall with sentry box, development of land and construction of ponds during the Seventh Plan period (1985-90). Except the construction of a boundary wall at a cost of Rs 13.07 lakhs and excavation of two ponds at Rs 0.21 lakh, the Institute did not undertake any work. Even the boundary wall was not formally taken over from CPWD due to some defects in its construction.

The plan of the farm envisages construction of 25 nursery ponds and 16 rearing ponds. Although two rearing ponds covering 0.75 acre of land were constructed by March

1991, breeding and development etc could not be udertaken (August 1992) due to non-supply of chemicals and non-allotment of fund by CIFA to frog culture division for purchase of fertilisers, feeds, seeds etc. Work relating to construction of laboratory and office building, development of land and excavation of remaining ponds was yet to be taken up (August 1992).

Further, following the recommendations of the Quinquennial Review Team (1983), ICAR sanctioned Rs 5.85 lakhs for purchase and import of special equipment for a Nuclear Transplantation Laboratory (NTL) at the frog culture division at Kalyani during the Seventh Plan period for undertaking advanced research on frog hybridization and for training fishery workers in the latest and sophisticated techniques of hybridization. But CIFA did not take any action for procurement of the equipment and as a result NTL could not be set up.

CIFA incurred an expenditure of Rs 27.67 lakhs during the period 1987-92 on account of salaries and TA etc of the scientific and other personnel attached to the farm. Non-completion of the required infrastructural facilities prevented the scientific and other personnel deployed on the project from being effectively and fully utilised. The abnormal delay in completing the infrastructural facility for the programme not only did not meet the objectives of the Frog farm but the Government's expenditure of Rs 51.51 lakhs was also not effective.

ICAR endorsed CIFA's reply (November 1992) which attributed the delay in construction work and procurement of equipment to paucity of funds. It was mentioned that even the sanctioned funds could not be remitted in full by ICAR to CIFA. It was contended that the project was, however, not allowed to suffer and was continued successfully from temporary structures. The facts on record about functioning of the project as brought out in the foregoing paragraphs do not, however, support this contention.

10.3 Delay in placement of order

The Purchase Committee of the Central Potato Research Institute, Shimla recommended, in January 1991, a proposal for urgent purchase of an equipment alongwith certain ancillary items from a foreign firm at a cost of US $ 6695 (Rs 1.35 lakhs) being the lowest of the four quotations received for the purpose. The quotation was

valid till August 1991. Director of the Institute approved, in March 1991, placement of orders with the foreign firm subject to availability of funds. The purchase was proposed to be made out of non-plan funds but was not pursued because of non-availability of funds during 1990-91.

In the following year (1991-92) provision was made for funds for the equipment under Plan and the Indian Council of Agricultural Research (ICAR) was approached to approve the purchase out of the Plan funds. Meanwhile, the firm was asked to send a fresh invoice valid upto April 1992 and the same for US $ 12235 (Rs 3.67 lakhs) was received in September 1991. The Institute then called for some more quotations in response to which another quotation of US $ 10622 was received. However, purchase from the former firm at the revised rate was approved in February 1992.

Even though provisions were made under Plan for the equipment in 1991-92, the purchase could not be finalised within the validity of the earlier lowest quotation (August 1991) as approval of ICAR was communicated only in January 1992.. Thus, timely decision was not taken to effect economical purchase resulting in avoidable extra expenditure of RS 2.32 lakhs. ICAR's contention that the purchase was approved in January 1992 and, therefore, the procurement of equipment was initiated thereafter is not tenable as the process of ICAR's approval should have been expedited in view of the validity of the lowest acceptable quotation expiring in August 1991.

10.4 Infructuous expenditure

Indian Veterinary Research Institute (IVRI), Izatnagar placed an indent in April 1983 on Directorate General of Supplies and Disposals (DGS&D) for import of micro processor controlled ultra centrifuge. Acceptance of tender was issued in September 1983 at a cost of Rs 3.35 lakhs. The equipment was received in IVRI in December 1984 after paying Rs 0.36 lakh for air freight and insurance. It was only in June 1987 that the equipment could be operated for 15 minutes only after which it started giving trouble. Further efforts by the service engineers could make the equipment operational for 13 hours only in October and early November in 1987. IVRI spent Rs 0.28 lakh in February 1990 on purchase of power line isolator, still the equipment could not function. The supplier stated in April 1990 that the equipment was stored in the most inhospitable environment and damage

caused by rodents had become irrepairable. The equipment was either to be replaced or completely refurnished at the manufacturer's premises at the cost of IVRI but, it is still lying uninstalled (February 1992).

IVRI accepted the facts in January 1992 and attributed the problems to the inexperienced Indian agent. However, the fact remains that a sophisticated imported equipment on which Rs 3.99 lakhs had been spent was lying uninstalled for about eight years.

Indian Council of Agricultural Research (ICAR) stated in February 1993 that the supplier did not honour their commitment. They had also stopped manufacturing the centrifuge. There was, therefore, no alternative left but to write off the equipment for which IVRI had been advised.

10.5 Follow up on Audit Reports

The Lok Sabha Secretariate issued instructions (April 1982) to all the Ministries requesting them to furnish notes indicating remedial/corrective action taken by them to the Ministry of Finance (Department of Expenditure) on the various paragraphs contained in the Audit Reports of the Comptroller and Auditor General of India as soon as they were presented to the Parliament. Such notes were required to be submitted even for paragraphs which were not selected by the Public Accounts Committee for detailed examination.

A review of the 'Action Taken Notes' on the observations of Audit contained in the Reports for the last five year's revealed that the Ministry has not submitted (March 1993) such notes on the following paras:

Audit Report Number and Year	Para No.	Caption
1. No 2 of 1992	12.8	Imported equipment not received

CHAPTER XI

Indian Council of Medical Research
(Department of Health and Family Welfare)

11.1 Institute of Cytology and Preventive Oncology

11.1.1 Irregular purchases

(i) Indian Council of Medical Research (ICMR) sanctioned in February 1989 and released in July 1989 a special fund of Rs 18.60 lakhs to the Institute of Cytology and Preventive Oncology for procurment of equipment and chemicals for Polmerase Chain Reaction (PCR) test for Human Immuno-Deficiency Virus (HIV) for Aids Research Study, without sanction of specific project in which these could be used even after a reference from the Institute.

The Institute purchased four equipment costing Rs 17.10 lakhs during 1989-90 including Sorvall centrifuge (Rs 5.12 lakhs) though this equipment was not included in the sanctioned list of equipment to be purchased out of this fund.

The entire purchase was made without reference to the Scientific Advisory Committee (SAC) of the Institute though required. It was mentioned at the time of purchase that the matter would be referred to SAC later which was also not done.

These equipment were to be used not for any routine diagnosis but for problematic cases or cases of dispute in AIDs to be referred to the Institute. Only one such case was referred to the Institute during the period of three years.

(ii) In another case, the Institute purchased in 1983 a Gamma Isotope Counter costing Rs 2.99 lakhs without obtaining clearance of the Bhabha Atomic Research Centre (BARC) for its use which was mandatory, resulting in blockade of funds for more than nine years. Ultimately the Counter had to be transferred to the Institute of Immunohaematology, Bombay (July 1992) because of absence of proper space and facilities at the Institute for use of the equipment.

11.1.2 Idling of equipment

It was noticed that Ultra centrifuge kontron Model T-1055 costing Rs 5.45 lakhs imported from a foreign firm in October 1987 could not be installed till December 1989 for want of three phase power line. The Institute did not foresee the prerequisites for its installation.

11.1.3 Advances awaiting adjustment

In order to get services or procure stores, the Institute had been making advance payments to government departments, local bodies and other private bodies. Advances amounting to Rs 8.58 lakhs were outstanding, as on 31st March 1992, for want of adjustments. Out of this, an amount of Rs 4.05 lakhs, including Rs 2.92 lakhs paid to private parties, was outstanding for periods ranging from one to eight years. ICMR stated (October 1992)that at present Rs 6.54 lakhs were outstanding.

CHAPTER XII

Council of Scientific and Industrial Research (Department of Scientific and Industrial Research)

12.1 Central Mining Research Station - audit review

12.1.1 Introduction

Central Mining Research Station (CMRS), Dhanbad was established in 1955 as one of the institutes under Council of Scientific and Industrial Research (CSIR) for providing research and development (R&D) back up for improvement in productivity of Indian Mines.

Activities of CMRS cover in-house and contract research and other supporting services viz consultancy and technical help, besides organising seminars, workshops, symposia etc. The activities are organised under various functional divisions and sections.

CMRS is headed by a Director who is assisted by the Research Council (RC) and the Management Council (MC). Functions of RC are to advise and recommend on formulation of research programmes, conduct periodic review of research activities, assess the progress and advise on fostering linkages between the laboratories and the Mining industries. MC is responsible for managing the affairs of the laboratories.

12.1.2 Scope of audit

CMRS is audited under Section 20(1) of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971. This review on the working of CMRS covers the period 1987-92.

12.1.3 Highlights

- **Plan allocation of Rs 392.50 lakhs was diverted to meet expenditure under non-plan without proper approval. (Para 12.1.4)**

- **Fifty eight scientists were recruited during 1989-91 without making budget provision and without approval of CSIR though many of those**

appointed remained without specific assignment. (Para 12.1.5)

- None of the 22 in-house projects could be completed. Out of 28 Grants-in-aid projects, only 20 were completed. Out of 272 Sponsored projects only 115 were completed. CMRS undertook 139 Sponsored projects on partly funded basis resulting in loss of income to the extent of Rs 192.73 lakhs. (Para 12.1.6)

- CMRS undertook 557 Consultancy problems out of which 420 were solved. CMRS did not realise fees for services under 'Service to Industries' which resulted in financial loss. (Para 12.1.7)

- The arrangement for transfer of technology and watching its utility for the industry was inadequate. (Para 12.1.8)

- Serious irregularities were noticed in purchase system. (Para 12.1.9)

- Stores costing Rs 24.52 lakhs and £ 77,287 remained unaccounted for one to six years. Stores costing Rs 3.43 lakhs were lying unused for over 10 years and stores costing Rs 2.74 lakhs were not used for over five years. Physical verification report showing discrepancies between ground balance and book balance was not prepared. (Para 12.1.10)

- Realisation of electricity charges from the staff at rates lower than those paid to the Bihar State Electricity Board by CMRS resulted in non-recovery Rs 7.39 lakhs. (Para 12.1.11)

12.1.4 Sources and uses of funds

CMRS is mainly financed through grants from CSIR. Financial assistance received from CSIR, revenue raised from own sources and expenditure for the last five years, ending 31 March 1992, is shown below:

Year	Receipts			Expenditure		
	CSIR grant	Own resources	Deposits of grants in-aid and consultancy projects	Capital	Revenue	Expr. on sponsored, grant-in-aid and consultancy projects
1987-88	333.00	56.73	158.47	58.91	260.62	89.90
1988-89	361.00	62.49	89.16	93.18	282.58	98.55
1989-90	305.00	77.16	68.37	75.44	334.87	83.47
1990-91	435.00	93.26	57.20	57.57	376.29	86.84
1991-92	380.00	54.61	110.33	73.30	412.08	96.34

Source of data : Annual Accounts

Income of CMRS from its own sources during the last five years varied between 25 **per cent** (1990-91) and 13 **per cent** (1991-92) of the total revenue expenditure. Expenditure on staff accounted for major portion of the revenue expenditure ranging between 76 **per cent** (1989-90) and 85 **per cent** (1991-92). Expenditure on research materials came down from 14 **per cent** (1989-90) to 8.4 **per cent** (1991-92).

It was also seen that during 1987-92 an amount of Rs 392.50 lakhs was diverted from plan allocation to meet pay and allowances of staff under non-plan without approval of CSIR.

12.1.5 Personnel management

During 1987-91, deployment of scientists (not including staff) was as under:

Staff	As on 1st April				
	1987	1988	1989	1990	1991
Number of scientists	165	182	182	201	237
Number of scientists assigned to specific R&D and other jobs	144	144	144	144	144

Number of scientists not assigned to specific job	21	38	38	57	93

It was observed that whereas deployment of scientists on specific R&D and other jobs remained stationery at 144 during the past five years, men-in-position increased from 165 in April 1987 to 237 in April 1991. Re-deployment of available manpower on completion/termination/dropping etc of projects was not done. CMRS stated that every attempt was made to utilise the available manpower. But, no record in support of the statement could be furnished.

CMRS had no additional R&D works for the annual plans 1990-91 and 1991-92, but 58 scientists were recruited without recording any justification and without budget provision. CSIR expressed serious concern over the large recruitment without its prior approval and refused to provide additional funds. As a result, CMRS had to divert plan allocation, without competent approval, to meet the burden of pay and allowances of the newly recruited scientists who had been appointed under non-plan.

CSIR stated (January 1993) that total scientific manpower (including staff) during the years 1987-88 to 1990-91 was 224, 200, 225 and 250 out of which 157, 134, 161 and 187 respectively were engaged in coal mining and non-coal mining research activities and the remaining were engaged in Civil and Testing activities. Regarding sudden addition of manpower, during 1990-92, it was stated that the recruitment was made as approved by the Director of CMRS to cope with the pressure of R&D work. "Pressures of R&D work" is not borne by facts as evidenced by deployment of the scientific manpower as mentioned above.

12.1.6 Research Projects

R&D activities of CMRS are conducted as in-house and contract research within the approved research areas. Contract research comprises (i) Grants-in-aid (GIA) projects, (ii) Sponsored projects and (iii) Collaborative projects.

In-house projects are undertaken by CMRS on their own and financed out of grants received from CSIR.

GIA projects were either part or whole of individual in-house projects, funded by Government departments/ agencies or international bodies to supplement CMRS effort in R&D, normally of basic exploratory nature.

Sponsored projects are wholly funded by the sponsors whereas collaborative projects are jointly funded by the clients and CSIR with the exception of full funding of nationally relevant ones related to Defence, Social Welfare and the like. Sponsored and Collaborative projects were intended for commercial application by the industries.

In-house research projects

CMRS selected 29 in-house projects for the Seventh Plan on the basis of proposals of the discipline heads and in consultation with the industries, keeping in view their immediate needs and priorities. The status of the twenty nine projects is indicated below:

Year	Number of projects brought forward	Number of projects completed	Number of projects dropped/ termi-nated	Number of projects in hand
1987-88	29	-	7	22
1988-89	22	-	-	22
1989-90	22	-	-	22
1990-91	22	-	-	22
1991-92	22	-	-	22

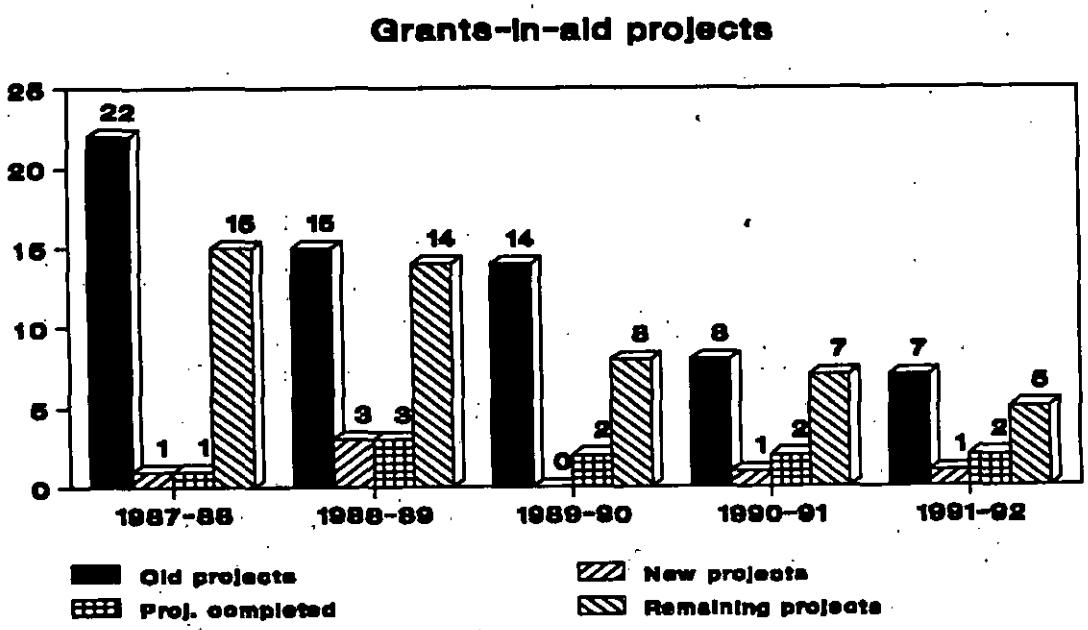
No new project was undertaken since 1987-88 and none of the projects was completed during the period 1987-92. The present status of the 22 projects continuing for the last five years could not be verified as the project records were not maintained. CMRS stated that though no project records were maintained, except for one or two, all the projects were taken as completed since none of them was spilling over to the R&D programmes of the 8th Plan. However, no evaluation of the "completed" projects was done for which RC would be approached. No periodical status report was sent to CSIR.

CSIR stated (January 1993) that completion reports of all the 22 projects were placed before RC on 30th September 1992. But, comments of RC were not made available.

Grants-in-aid (GIA) projects

During 1987-92, CMRS had 28 GIA projects including 22 incomplete projects of ealier years and six new projects undertaken during the period. The status of the projects is indicated below :

Year	No. of projects brought forward from previous year	New projects under-taken during the year	No. of projects completed	Final comple-tion report submitted	No. of projects termi-nated	No. of projects in hand at the end of year
1987-88	22	1	7	1	1	15
1988-89	15	3	2	3	2	14
1989-90	14	-	6	2	-	8
1990-91	8	1	2	2	-	7
1991-92	7	1	3	2	-	5



Out of 28 projects undertaken during 1987-92, 20 projects were completed with delays ranging between one to four years; final completion reports, however, were submitted on 10 projects only. Out of the balance eight projects, three were not completed though much delayed, three were terminated before completion and two were not due for completion.

The funding Ministries had to grant extensions of project durations on grounds like technical reasons, lack of infrastructural facilities, delay in procurement of equipment, non-deployment of staff etc. Standing Scientific Research Committee of the Department of Coal criticised (June 1989) slippages in project duration and suggested that further advance of funds be suspended and fresh project proposal not entertained.

CMRS did not take suitable measures to submit the completion reports to the Ministries and stated in June 1992 that final project reports of the remaining projects would be submitted to the Ministries in phases by March 1993.

CSIR stated (January 1993) that reports of seven completed projects were placed before RC on 30th September 1992. However, comments of RC were not made available.

The following deviations from terms and conditions of Grants-in- Aid were also noticed:

- Without approval of the funding Ministry CMRS reallocated funds between non-recurring and recurring heads, purchased capital equipment worth Rs 5.71 lakhs not included in the approved list and diverted Rs 3.41 lakhs from surplus funds of the completed projects for purchase of equipment for general use equipment worth Rs 2.76 lakhs purchased out of funds so diverted, remained unutilised (June 1992). Further, against Rs 11.15 lakhs allocated for manpower Rs 5.50 lakhs were spent, and the balance Rs 5.65 lakhs diverted for expenses on travelling allowance/ contingencies etc. without approval of the funding Ministry. CSIR stated (January 1993) that non-plan funds provided in these projects were in general used for purchasing modern

equipment necessary for updating research facilities in the laboratory. The fact, however, remains that the funding Ministries ought to have been approached for approval for diversion of funds and retention of the equipment in CMRS.

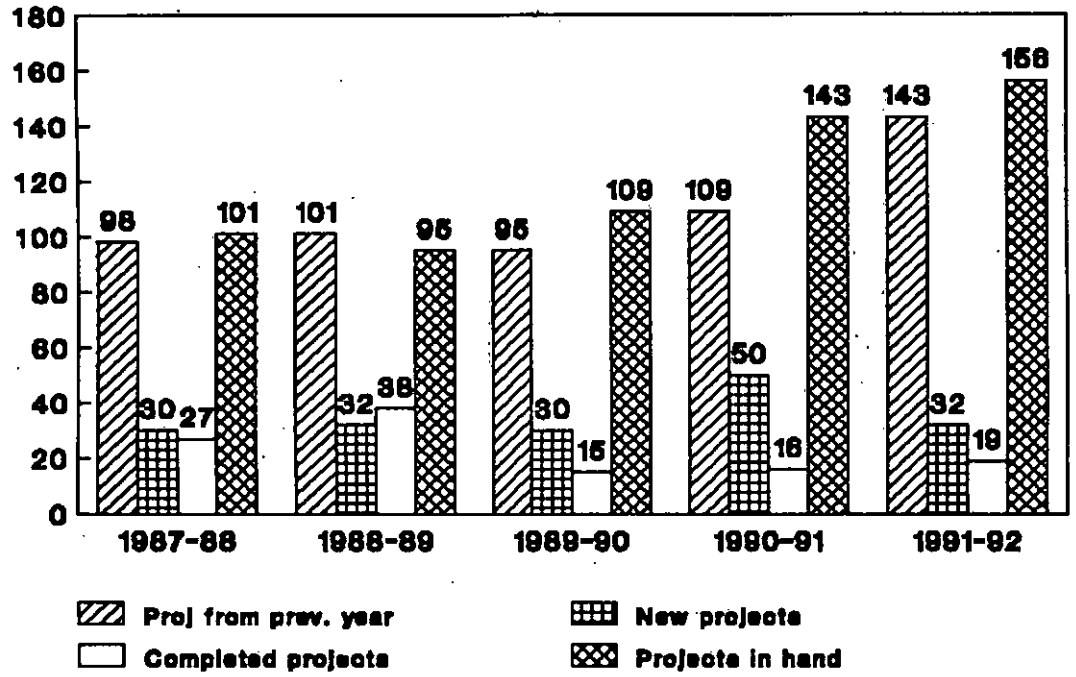
- After completion of the projects list of assets created out of GIA funds and final projects accounts were not rendered to the Ministry. CSIR stated (January 1993) that furnishing accounts statements were delayed.

Sponsored projects

CMRS undertook 272 sponsored projects during 1987-92. Status of these projects was as detailed below:

Year	No. of Projects brought forward from previous year	No. of projects under-taken during the year	No. of projects completed during the year	No. of projects dropped/ termi-nated/ aban-doned	No. of projects in hand at the end of the year
1987-88	98	30	27	-	101
1988-89	101	32	38	-	95
1989-90	95	30	15	1	109
1990-91	109	50	16	-	143
1991-92	143	32	19	-	156
Total			115		

Sponsored projects



Of the above backlog of incomplete projects, 37 related to the period prior to 1987-88 and 86 projects taken up during the period from 1987-91 were incomplete till March 1992. Reasons for non-completion of projects were not forthcoming.

Selection, execution, monitoring and costing of these sponsored projects were done by the discipline heads with approval of the Director but approval of RC was not obtained though required under CSIR guidelines. CMRS accepted (June 1992) that approval of RC was required but, the projects being of short duration and time bound, approval of RC would have delayed execution of the jobs. It was not indicated as to why even ex-post facto approval of RC was not obtained.

Sponsored projects on partially funded basis

During 1987-92, CMRS undertook 139 sponsored projects on partially funded basis, though there is no provision in the CSIR guidelines, for undertaking sponsored projects on

partially funded basis. Against the total estimated cost of Rs 281.32 lakhs for the project, only Rs 88.59 lakhs were realised.

CMRS stated (June 1992) that sponsored projects on partially funded basis were undertaken with approval of the Director and vetted by CSIR, but approval of RC was not obtained. CSIR stated (January 1993) that these were as per their guidelines. However, guidelines on contract research of sponsored projects has made exception to full funding for specific nationally relevant projects related to Defence, Social Welfare and the like only. Also, these projects are undertaken where either general interest of the industry was involved, and not the interest of any particular mine, or where CMRS stands to gain. A few illustrations where the criteria were not met, are mentioned below :

- Two projects namely, (i) Environmental Monitoring at VCG Site, Mehsana and (ii) Surface Subsidence Investigations Mehsana, sponsored by Oil and Natural Gas Commission (ONGC) were undertaken by CMRS on partially funded basis at estimated costs of Rs 45.82 lakhs and Rs 2.15 lakhs respectively. Against the estimated costs, CMRS charged and realised Rs 10 lakhs and Rs one lakh only respectively resulting in a total loss of Rs 36.97 lakhs, though the projects were of interest to ONGC only.

- Another sponsored project entitled Ground Control Investigation in Balaghat Mines sponsored by Manganese Ore India Limited was undertaken by CMRS in November 1989 at an estimated cost of Rs 4.07 lakhs on partially funded basis. Instead of realising the entire cost of equipment of Rs 3.09 lakhs, CMRS realised only Rs 1.50 lakhs resulting in loss of Rs 1.59 lakhs.

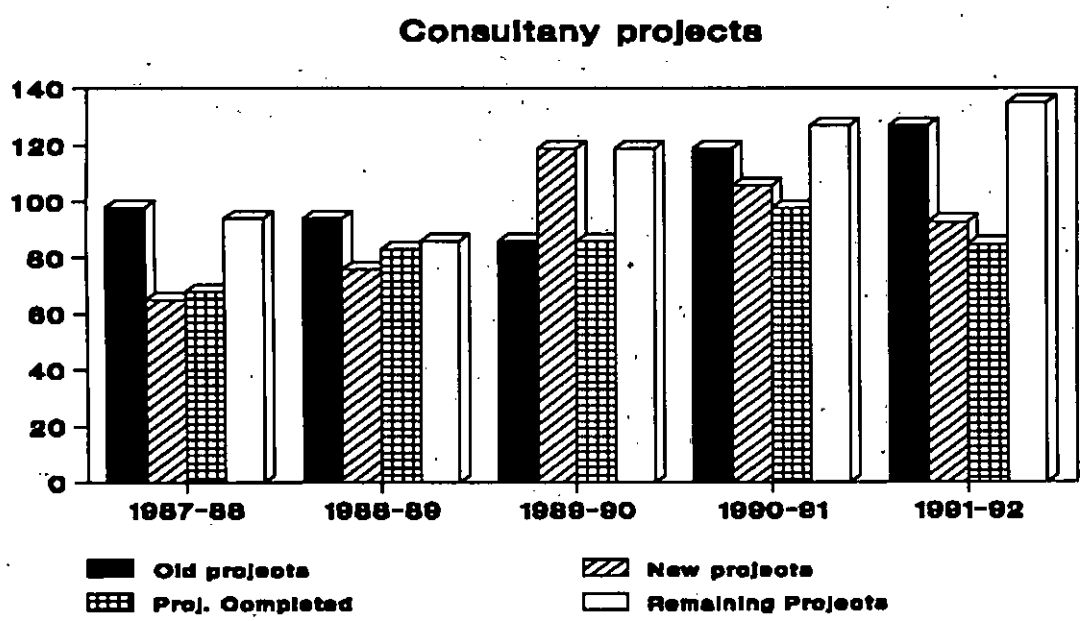
12.1.7 Service to industries

Based on its expertise and in lieu of fees charged, CMRS renders consultancy services to solve day to day problems of their clients. The problems are identified as consultancy on merit by the discipline heads and executed with the approval of the Director and under intimation to CSIR. CSIR guidelines provide that a sponsored project, cost of which is upto Rs 0.20 lakh, may be classified as

consultancy project. But, CMRS stated (June 1992) that it was not possible to adhere to these guidelines.

During 1987-92, CMRS had undertaken 557 consultancy projects, the status of which is indicated below:

Year	No. of projects brought from previous years	No. of projects under-taken during the year	No. of projects completed during the year	No. of projects dropped during the year	No. of projects in hand at the end of the year
1987-88	98	65	68	1	94
1988-89	94	76	83	1	86
1989-90	86	119	86	-	119
1990-91	119	106	98	-	127
1991-92	127	93	85	-	135
Total			420	2	



Out of the problems taken up till 1990-91, 68 problems remained unsolved at the end of 1991-92, for periods

varying from one to four years. Reasons for non-completion were not available on records, nor were these problems discussed in the meetings of RC or by any expert committee, for necessary direction and guidance.

12.1.8. Transfer of technology

During 1987-92, CMRS filed eight designs/process for patenting. But, none was approved even after three years of filing and hence could not be released for commercial exploitation. CSIR intimated (January 1993) that four designs were developed under sponsorship and were made available to them (sponsores) and the other four have since been patented, the dates of patent was however not forthcoming.

From the records of CMRS in regard to transfer of technology it was not possible to verify the date and cost of development, date of transfer, name of the beneficiary etc. There was no mechanism to get feedback from the user of the technology to assess its impact on the industry. The arrangement for transfer of technology and watching its utility was thus inadequate. CSIR stated (January 1993) that development and updating of the technologies is a continuous process. But, that being so, it was all the more necessary to have an arrangement for feedback from the users of the technology developed and CSIR was silent about evolving a proper system. Moreover, CSIR's guidelines for technology transfer and utilisation of knowledge base requires annual follow up to assess utilisation status of the technology transferred.

12.1.9 Purchase

The Rationalised Purchase Procedure prescribed by CSIR provides inter alia that :

- Indenting officers shall give justification, purpose, delivery schedule within which the supply is desired to be arranged.

- For procurement of stores items, a standing Purchase Committee will be constituted under the chairmanship of a senior scientist who will decide the method of procurement of item after studying the data retrieved from the data bank for relevant items.

Till July 1990-91, CMRS did not follow the rationalised purchase procedure circulated by CSIR in 1988 nor were the rules and procedure as laid down in General Financial Rules for procurement of stores adhered to. The rationalised purchase procedure was partially implemented in August 1991. However, data base/ data bank is yet to be introduced. CSIR admitted (January 1993) that there were some lapses in adopting the modified purchase procedure.

In test check in audit following irregularities were noticed

- No purchase committee or any other body was constituted to examine purchase proposals for judicious procurement.

- Procurement was made on the basis of enquiry and the source recommended by the indentor.

- Purchase proposals were not examined technically or financially before submission to the competent authority for approval.

- For lack of co-ordination between the purchase branch and indentor, avoidable procurement was made. A few illustrations are cited below :

(i) CMRS purchased three equipment in December 1991 for their general use at a total cost of Rs 9.18 lakhs for which no budget provision existed. The expenditure was charged to the project account of one GIA project without approval of the funding Ministry. This resulted in diversion of funds which was not permissible. The equipment also remained unused (June 1992).

(ii) Two equipment purchased for a GIA project at a total cost of Rs 3.67 lakhs against supply order placed in January 1989 were received after the project was completed in June 1989. These equipment remained unused (June 1992). Further one of the two equipment costing Rs 1.13 lakhs was purchased without approval of the funding Ministry.

(iii) During 1987-92, CMRS purchased a large number of mechanical and electro mechanical load cells of different categories and specifications from an Indian firm at a total cost of Rs 45.61 lakhs without any

tender enquiry or negotiations with the supplier. It was also noticed that the prices paid in a year for the load cells were higher than the prices paid for the load cells of the same specifications in the subsequent year.

12.1.10 Stores

CMRS has no manual for maintenance and disposal of stores. Procurement of stores is made on the basis of requisitions received from the indenting officers with financial approval of the competent authority. However minimum, maximum and reordering levels of stores, to ensure proper control and stock holding were not fixed. CSIR stated (January 1993) that to ensure proper control of stock holding, CMRS has now started minimum, maximum and reordering levels of stores.

Test check of stores revealed that 62 serviceable items costing Rs 24.52 lakhs and four items costing £ 77,287 purchased during 1987-91 were not accounted for so far (June 1992) though procured about one to six years ago. CMRS stated in June 1992 that the stores were received in damaged condition and were not taken in stock ledger.

Five items of stores, costing Rs 3.43 lakhs procured during 1980-87 were lying unused (June 1992) though the projects for which these were procured were completed in 1989. Similarly, eight items of stores valuing Rs 2.74 lakhs remained unutilised for periods varying between six months to five years (June 1992). CMRS stated in June 1992 that the stores were shown as issued. The reply is not adequate as the stores were issued after being pointed out by Audit and their utilisation had not been indicated.

CSIR intimated (January 1993) that out of five unused items, three had been issued and remaining two were treated as surplus. Also, unutilised stores had been issued to the indentors except one item which had been kept reserved to meet any breakdown.

Physical verification reports showing the discrepancies between book balance and ground balance were not prepared and submitted for remedial measures.

12.1.11 Supply of electricity to staff quarters

CMRS was getting its electric supply from Bihar State Electricity Board in bulk at prevailing industrial rates varying from Rs 1.01 to Rs 1.33 per unit for the

laboratory, including the staff quarters, since April 1987. Recovery of electricity charges from the staff was being made at the flat rate of Rs 0.45 per unit during the last five years (1987-92) on the basis of consumption recorded in the meters installed in each staff quarter, resulting in short recovery of Rs 7.39 lakhs during that period. CSIR stated (January 1993) that the matter was being reviewed by an Internal Committee of CMRS.

12.1.12 Bank reconciliation

Bank reconciliation had been carried out upto December 1991, but adjustment/settlement of discrepancies were not carried out for the last 18 years (April 992).

Scrutiny of the bank reconciliation statement of December 1991, as on 31st March 1992, revealed as under:

Description	Number of items	Amount (Rs in Lakhs)	Period to which these relate
Debit in cash book but not shown in bank statement.	90	6.83	1978-79
Debit in bank statement but not shown in cash book.	217	46.92	1975-76
Credit in cash book but not shown in bank statement.	97	9.93	1975-76
Credit shown in bank State-ment but not in cash book.	132	49.23	1974-75

The difference between balances as per Bank statement and Cash Book as on 31st December 1991 was Rs 12.83 lakhs. CSIR stated (January 1993) that bank reconciliation has been done upto June 1992 and that old outstanding items were being settled in consultation with the Bankers.

12.1.13 Outstanding advances

CMRS had been making advance payments to officials, private parties, Government organisations etc on account of travelling allowance, purchase and supply of materials/equipment etc. It was noticed that an amount of Rs 34.93 lakhs relating to the period upto March 1992 was outstanding for adjustment. Of these, Rs 19.89 lakhs with private parties were outstanding for periods ranging from 6 to 72 months and Rs 8.91 lakhs towards TA/LTC advances with officials of CMRS.

12.2 Indian Institute of Petroleum -audit review

12.2.1 Introduction

Indian Institute of Petroleum (IIP) was set up in September 1960 as a national laboratory to provide technological back up and train persons required for the petroleum industry.

The objectives of IIP are to :

- undertake research and development (R&D) in the fields of petroleum, petrochemicals and natural gas;
- collect and disseminate information in these fields;
- conduct techno-economic and market surveys for petroleum and its products and petrochemicals;
- train technical personnel for the petroleum industry and
- assist the Bureau of Indian Standards (BIS) in formulating standards for the petroleum products, petrochemicals and appliances using petroleum fuels and lubricants.

12.2.2 Organisational set-up

IIP, which is headed by its Director, has seven operational (R&D) divisions supported by five infrastructural divisions.

Research Council (RC) of IIP is the highest body to evaluate and regulate R&D activities and assess their progress. Its main functions are to advise and recommend on formulation of research programmes keeping the Five Year Plans and national priorities in view, conduct periodical reviews of research activities, assess progress and advise on future direction and foster linkages between IIP and academic institutions, other research organisations, industrial and potential clients. IIP has a Management Council (MC) headed by the Director for administering and managing the affairs and environs of the laboratory.

As on 31st March 1992, against the sanctioned strength of 190 scientific, 417 technical and 187 administrative posts, men in position were 182, 347 and 140 respectively. There were no norms for determining the ratios between scientific, technical and administrative manpower.

12.2.3 Scope of audit

IIP is audited under section 20(1) of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971. This review covers activities of IIP for the period 1987-92.

12.2.4 Highlights

- **IIP was unable to generate funds from sources outside CSIR to the extent (30 to 40 per cent) required under CSIR guidelines. (Para 12.2.5)**

- **IIP did not have a system to clearly define relevance oriented and excellence oriented projects. It could not ensure 70:30 distribution of its efforts on the two categories as observed by the Research Council. Though sponsored projects were given more attention overlooking in-house projects, there were delays upto 27 months in completion of the sponsored projects. Not withstanding RC's desire, no work on evolving standards for pollutants was initiated. (Para 12.2.6)**

- **During 1987-92, IIP had developed only 24 products and processes and of these only seven**

products/processes had been patented for commercialisation. (Para 12.2.7)

- **High value equipments were installed long after their receipt and Hydrocracker Pilot Plant was not operational. (Para 12.2.8)**

- **Monitoring and evaluation of research projects had been inadequate. There was no systematic information for financial and technical monitoring. (Para 12.2.9)**

- **Number of training programmes organised and professionals trained by IIP showed declining trend during 1985-92. (Para 12.2.10)**

- **IIP had assets valuing Rs 1509 lakhs as on 31st March 1992. However these were not reconciled with the records of the concerned divisions/ sections. (Para 12.2.12)**

12.2.5 Income and expenditure

IIP received Rs 23.89 crores from CSIR during 1987-92. Other receipts towards sponsored projects and royalty during the same period were Rs 4.01 crores amounting to 17 **per cent** of the expenditure of Rs 23.95 crores. This fell far short of the CSIR guidelines issued in December 1986 stating inter alia that all national laboratories/institutes should generate funds from outside agencies to the extent of 30 to 40 **per cent** to supplement their resources. CSIR stated in February 1993 that vigorous efforts were being made to meet the target of external cash flow.

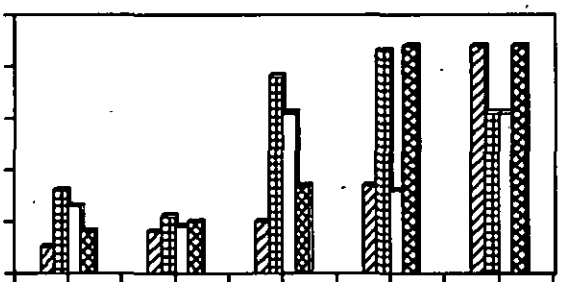
Accounts of 63 projects costing Rs 108.21 lakhs which were completed between April 1988 and November 1991 were closed only between January and April 1992 and an unspent balance of Rs 36.20 lakhs was transferred to the Laboratory Reserve Fund which was created in March 1992.

12.2.6 Research activities

Projects undertaken by IIP are broadly categorised as i) In-house projects which are conceived by the laboratory to further any of the objectives assigned to it; ii) Sponsored projects which are sponsored and financed by Governmental or Non Governmental organisations and iii) Consultancy projects where IIP charges fee at a fixed rate.

The tables below depicts the details of projects carried over, new projects, projects completed and on going projects during the period 1987-92.

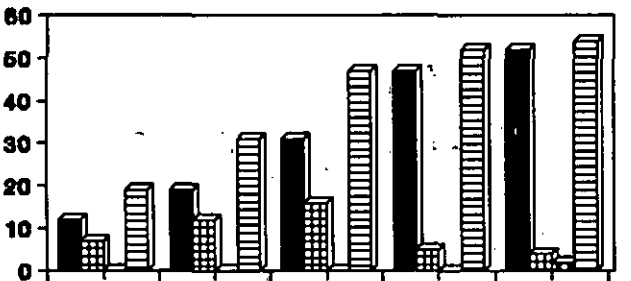
SPONSORED PROJECTS



	1987	1988	1989	1990	1991
PREV YEAR PROJ	6	8	10	17	44
NEW PROJECTS	16	11	38	43	31
PROJ COMPLETED	13	9	31	16	31
ONGOING PROJECTS	8	10	17	44	44

PREV YEAR PROJ NEW PROJECTS
PROJ COMPLETED ONGOING PROJECTS

IN-HOUSE PROJECTS



	1987	1988	1989	1990	1991
PREV YEAR PROJ	12	19	31	47	52
NEW PROJECTS	7	12	18	5	4
PROJ COMPLETED	0	0	0	0	2
ONGOING PROJ	19	31	47	52	54

PREV YEAR PROJ NEW PROJECTS
PROJ COMPLETED ONGOING PROJ

During 1987-92, the total number of projects were 183 of which around 25 **per cent** were in-house projects. While a substantial number of sponsored projects had been completed, only two in-house projects could be completed during the same period. During the last five years (1987-92) only two consultancy projects were taken up and completed.

CSIR attributed (February 1993) the slippage in the time targets of in-house projects to IIP's efforts to generate resources from outside CSIR. However, as mentioned in para 5, the receipts from outside sources remained only around 17 **per cent** of the expenditure. With this emphasis the Institute undertook even projects which did not necessarily have long term R&D benefits. Research Council expressed their concern about this in November 1990. IIP stated in September 1992 that in pursuance of the directions of RC, twenty one development oriented projects had been initiated. Perusal of proceedings of RC meetings during the period 1987-92 revealed that no action had been taken to expedite completion of the in-house projects which had been in progress for several years.

A test check of the sponsored projects indicated delays up to 27 months with reference to their targetted dates.

RC in their meetings held in December 1988 had opined that user involvement must be secured even for in-house projects by early identification of forward linkage. Seventy **per cent** of the total effort was to be made on user oriented (relevance oriented) R&D projects and thirty **per cent** on excellence oriented (for development of expertise of the scientists/technicians). It was observed that there was no system in IIP to clearly define the two categories to ensure that this objective was attained.

National plan priorities are translated into action by CSIR by identifying mission mode projects and thrust area projects for each institute/laboratory. The institutes/laboratories in turn are required to plan and organise their activities as per the identified areas intimated to them by Technology Advisory Board (TAB) of CSIR. The thrust areas identified by IIP were as follows:

- Petroleum conservation, Product applications, Engine emissions;

- Development of Fuel Efficient Combustion Systems;

- Performance evaluation of petroleum products and

- Alternative Sources of Hydrocarbons.

CSIR while formulating Science and Technology programme for the petroleum sector had observed that improvement of efficiency of engines and appliances consuming petroleum product, standards for gases and acqueous pollutants and development of natural gas as fuel and feed stock should be treated as the most immediate need. The programmes should be oriented to achieve highest success in this area. Recognising the need for high recovery for middle distillates, emphasis on development of cracking catalyst was also placed. IIP was to concentrate only on refining catalyst and petrochemical catalysts were assigned to the National Chemical Laboratory, Pune and the Regional Research Laboratory, Hyderabad. CSIR stated in February 1993 that work on development and improvement of catalysts and process has since been initiated.

Work on utilisation of Compressed Natural Gas (CNG) in engines was initiated in May 1990 as a thrust area project but the progress had been slow. CSIR stated in February 1993 that with creation of necessary infrastructure, sponsorship for the programme has been secured and it was progressing.

RC in their meeting held in December 1988 had observed that pollution was an area where the country had not made much efforts in the past. Besides emission from 2-stroke engines and particulate emission from diesel needed attention. No work on evolving standards for pollutants was initiated.

12.2.7 Technology transfer

IIP was engaged in product/process development related to petroleum products and bio-technology and had developed 24 products, processes and maintenance models during the last five years. Out of these only seven products/ processes had been patented for commercialisation. RC had observed in December 1988 that more and more patents had to be filed to provide "visibility to IIP's work".
IIP stated (June 1992) that the major processes developed by them were generally for captive use of refineries and

petrochemical plants. Some of the chemicals and intermediates developed were useful for small/medium industries. Industry always went for tested technologies and the Institute has therefore to locate a collaborator for scale up development before commercialisation.

Yearwise break-up of technologies developed and patents filed was as follows :

	1987-88	1988-89	1989-90	1990-91	1991-92	Total
Technology developed	3	7	2	5	7	24
Patents filed	2	-	4	7	2	15

IIP has so far filed 15 patents and transferred 18 technologies to industries. One of the IIP's product has been granted an international patent. CSIR stated in February 1993 that patents were not filed under the mistaken impression that patent was to be filed only after the process was developed and commercialised.

According to the CSIR guidelines, though there can be no rigid formula for pricing intellectual property, the price normally ranges from 2 to 10 **per cent** of either plant and equipment cost or projected turnover of the unit for a period of five years of production. Price should, in any case, be reviewed at least after every three years. In IIP, no data base for effective checks or monitoring of royalty/premia was being maintained. CSIR stated in February 1993 that maintenance of manual data base was in practice for regular monitoring of the royalty.

It was noticed in audit that royalty and premia from sponsored projects was very low compared to the value of industrial production based on IIP know-how. The table below covers the period 1987-92.

	1987-88	1988-89	1989-90	1990-91	1991-92
			(Rs in lakhs)		
Industrial Production based on know how *	68000	75000	75000	100000	100000
Royalty	1.94	0.60	0.05	25.60	12.44
Percentage of royalty based on IIP know how	0.00	0.00	0.00	0.03	0.01

*These figures are on the basis of IIP's presumptions.

From the table it would be seen that percentage of royalty earned by IIP based on industrial production was negligible during 1987-92.

12.2.8 Delay in installation/ idling of equipment

Delay in installation of equipment

From a test check of records, eight imported and indigeneous equipment costing a total of Rs 131.38 lakhs were noticed to have been installed after delays upto 29 months after receipt.

Unutilised equipment

(i) IIP sanctioned an expenditure of Rs 8.06 lakhs in February 1984 for import of Universal Testing Machine. Letter of credit was established in February 1984. The consignment was received in IIP in March 1985 and on opening the consignment some of the parts were found missing. Items short supplied were received in June 1985. Service engineers of the firm visited IIP in February 1986 for installation and commissioning of the machine but found certain parts incompatible with the unit and these parts were received in March 1987. The machine was commissioned in January 1988 but could not be demonstrated as satisfactory operation of the machine depended on availability of air conditioner and three phase servo stabilizer, a prerequisite which had not been provided by the Institute and therefore could not be utilised for over six years. IIP stated (June 1991) that all testings required to be done with the help of the machine were done by an alternative route and use of the machine which was fully functional, was being planned for future activities. However, there were snags in the computer operations. CSIR accepted (February 1993) the facts.

(ii) IIP acquired in December 1986 a pilot-plant from a foreign supplier at a cost of Rs 193 lakhs. The plant was received in IIP in September 1987 and was commissioned in October 1987. The object was to study the performance evaluation of catalysts for hydrocracking technology development. IIP procured spare parts costing Rs 25.35 lakhs and paid commission, to an Indian agent, amounting to Rs 6.05 lakhs. To make the plant functional IIP spent another sum of Rs 7.91 lakhs as service and

diagnosis charges. Three scientists were also sent abroad for training for operation of the plant. The plant has not so far been made functional.

In the RC meeting held in November 1990, it was desired that hydrocracking pilot plant should be made fully operational in the shortest possible time obtaining technical assistance from Indian Oil Corporation and Computer Maintenance Corporation. A task force was advised to be set up and made responsible for this job. However action was not initiated as per direction of RC.

In April 1992, foreign experts were invited who found the hardware components defective and suggested replacements. They further opined that reasons for the defective parts could be bad ambient operating conditions during the rainy seasons and advised that technicians of IIP Instrumentation/Electronic group and software team should be trained for maintaining the system. Further action taken or contemplated was not made known to Audit.

The equipment costing Rs 193 lakhs received in September 1987 was lying idle. CSIR accepted (February 1993) the facts.

12.2.9 Monitoring and evaluation

CSIR framed guidelines for project budgeting and cost accounting procedure in the year 1984 with the aim to secure effective project monitoring. The guidelines required the institutes / laboratories to follow the system of project accounting. This was intended to

- inculcate cost and time consciousness and accountability among the project leaders
- provide information to the management and
- monitor the flow of financial inputs in relation to physical output.

The institutes/laboratories were also required, interalia, to prepare detailed project report for every project being considered for implementation clearly indicating the objectives, milestones, time schedules computation of manpower, cost, mode of funding etc.

It was noticed in audit that project proposals did not contain all the relevant details required for effective monitoring. Project accounts were not being maintained nor were the milestones clearly established. Use of Project Evaluation and Review Technique in the project formulation was never resorted to. There was no mechanism for review of the financial and technical aspects of the projects. Folders for individual projects were not being maintained particularly in respect of in-house project.

The need for Project Monitoring and Evaluation (PME) was also emphasised during the second meeting of RC held in December 1988. It was however noticed that though IIP had set up a section for PME in respect of in-house project, budgeting, costing and monitoring of individual projects were not being done (August 1992). In the sponsored projects, actual cost evaluation was not done and costing done at the proposal stage was passed on to the books of accounts. CSIR stated (February 1993) that the PME group had recently been strengthened and plans are under way to maintain the folders including actual expenditure of each project by the group.

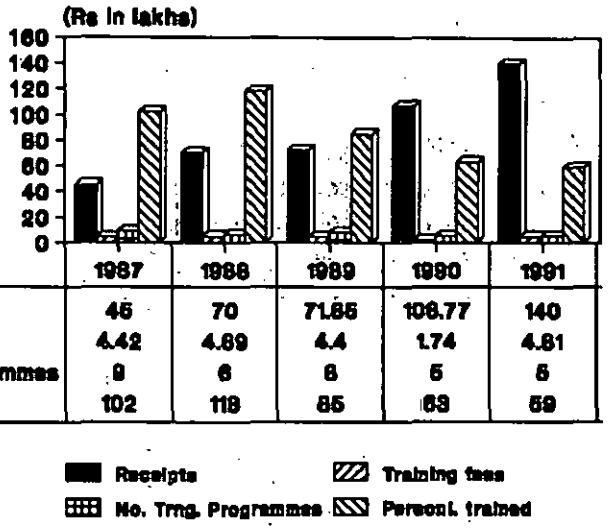
The Research Advisory Council of IIP which reviewed progress of projects was reorganised in April 1988 as Research Council (RC) as per the direction of the Director General, CSIR. The aim was to provide a thrust, suggest new areas of research and orient R & D programmes in the desired direction apart from serving as a professional vehicle for monitoring of research allocation and their utilisation in each laboratory . RC was required to meet twice a year and till March 1992 it had held eight meetings. For every meeting IIP produced agenda items which besides other points included action taken on recommendations of RC during previous meetings and points for which RC's attention was warranted. The follow up action on recommendations made by RC were not being reported in the subsequent meetings of RC.

12.2.10 Training

IIP provides professional training on "Petroleum refining and petrochemicals" to chemists and engineers and on "Utilisation of fuel and lubricants in engines and machines" to mechanical engineers of industries dealing with petroleum products and charges training fee at a rate agreed between IIP and the industries concerned.

Thirty three training programmes were organised and a total of 427 personnel were trained. Receipts on account of training fees were very low as compared to the total receipts from sponsored projects which is depicted below:

RECEIPTS FROM SPONSORED PROJECTS AND TRAINING



	1987	1988	1989	1990	1991
Receipts	46	70	71.85	108.77	140
Training fees	4.42	4.69	4.4	1.74	4.81
No. Trng. Programmes	9	6	6	5	5
Personl. trained	102	118	85	69	69

During 1987-92 the number of programmes organised and professionals trained by IIP had steadily declined.

Receipts on account of training fee form a negligible component of the total external cash flow to IIP. IIP stated that action for preparing the calendar for training programmes by contacting various organisations has been started during 1992-93.

12.2.11 Demurrage and wharfage charges

Expenditure on demurrage and wharfage charges exceeding Rs 250 incurred by IIP was required to be reported to CSIR. Notwithstanding the existence of their liaison office at Delhi, IIP had incurred expenditure of Rs 5.10 lakhs on account of demurrage in 349 cases, during the years 1986-92 on imported consignments. Proper records pertaining to payments with details of demurrage were not maintained. These cases of payment of demurrage/wharfage charges exceeding Rs 250 were not reported either to CSIR or to the MC of IIP. CSIR stated in February 1993 that the Institute has taken measures to ensure speedy

clearance and is in the process of getting all cases regularised by reference to MC.

12.2.12 Assets

IIP held assets valued at Rs 1509 lakhs as on 31st March 1992, but the asset registers were incomplete and did not add up to the said figure. The figures included in the balance sheet were also not reconciled with the progressive totals of the asset registers. The figures were arrived at by adding the acquisitions and subtracting the value of stores consumed and written off. CSIR stated in February 1993 that the figures were being reconciled.

The following deficiencies were also noticed in audit :

(i) Physical verification of all stores was not being done annually though required under the General Financial Rules. Physical verification of stores held by various divisions of IIP was conducted upto 1985 only. CSIR stated in February 1993 that physical verification upto 1990-91 had since been carried out.

(ii) It was noticed that 117 items (37 items of Maintenance stores costing Rs 3.63 lakhs and 80 items of Engineering stores costing Rs 0.73 lakh) declared unserviceable in 1985 were yet to be disposed of.

(iii) Stores containing 748 items costing Rs 15.54 lakhs of various kinds procured prior to 1960 were lying in stock unused. No action had been taken by IIP for identifying surplus/ obsolete stores.

(iv) Two hundred and fifty two non consumable/electrical items purchased in December 1988 for Rs 2.34 lakhs and M S plates costing Rs 3.87 lakhs procured during March/May 1991 required for workshop were lying in stores unissued resulting in blockade of funds to the tune of Rs 6.21 lakhs.

(v) Seventy one items of Chemical and Glassware procured during 1968 to 1983 were lying in stores without issue and had out-lived their utility. IIP was not able to indicate book value of these items.

CSIR stated in February 1993 that the necessary action was being taken in this regard.

12.2.13. Other interesting points

Loss of interest

Average monthly expenditure of IIP was Rs 56 lakhs to Rs 74 lakhs during the period 1989-92. However, amount retained in the current account was much higher than the immediate requirement of IIP as is evident from the monthly closing balances as detailed below:

Month	Closing balance (Rs in lakhs)
March 1991	98.21
November 1991	80.52
December 1991	100.57
January 1992	129.26
February 1992	122.69
March 1992	166.29

Taking into account the average of five months from November 1991 to March 1992 retention of money in excess of average monthly requirements had resulted in loss of Rs 1.88 lakhs (approximately) by way of interest @ 10 **per cent** per annum by not depositing money in short term deposit. CSIR stated in February 1993 that out of closing balance of March 1992, a sum of Rs 75 lakhs was invested in April 1992.

Bank reconciliation

IIP has a bank account with State Bank of India. Bank reconciliation had been done upto March 1992 but the adjustment/settlement of discrepancies/ differences for the last 20 years had not been carried out so far (June 1992).

Years	Credit afforded by bank not taken in Cash Book	No. of cases	Cheques issued but not debited by bankers	No of cases	Valuable deposited but credit not afforded by bankers	No. of cases	Debit raised by Bankers not taken in cash Book	No. of cases
1	2	3	4	5	6	7	8	9
				(Rs in lakhs)				
From 1971-72 to 1984-85	-	-	-	-	-	-	1.326	60

1985-86	-	-	-	-	-	-	0.032	6
1986-87	-	-	-	-	-	-	0.021	3
1987-88	-	-	-	-	-	-	0.016	4
1988-89	-	-	-	-	-	-	0.696	8
1989-90	0.066	2	-	-	-	-	1.073	34
1990-91	0.144	7	0.008	2	-	-	1.412	53
1991-92	0.167	19	21.345	98	50.613	19	7.022	82
Total	1.347	28	21.353	100	50.613	19	11.598	250

CSIR stated that in February 1993 that out of 28 cases of credits afforded by bank and not taken in cash book seven items for Rs 0.25 lakh had been adjusted. Further, out of 250 cases relating to debits raised by bank and not taken in the cash book, only 23 cases amounting to Rs 2.42 lakhs were adjusted.

Outstanding advances

(i) IIP had been making advance payments to officials, private parties, Government organisations etc on account of Travelling Allowance (TA), Leave Travel Concession (LTC), purchase and supply of materials/ equipment etc. It was noticed that an amount of Rs 141.67 lakhs was outstanding for adjustment as on 31st March 1992. Of these, Rs 128.14 lakhs were outstanding with private parties, Rs 1.28 lakhs with Government organisations/ Public Sector Undertakings from 1983-84 onwards while an amount of Rs 12.35 lakhs towards TA/LTC and local purchases was pending with officials of IIP since 1988-89.

CSIR stated in February 1993 that as on 30th November 1992 the amounts of advances outstanding against private parties were Rs 22.12 lakhs for local purchase and Rs 4.46 lakhs for TA and LTC and the Institute had made vigorous efforts to adjust these advances.

(ii) IIP has been importing laboratory and other equipment by opening letters of credits (LC) through its bankers and keeping the amount of LC as margin money. A sum of Rs 127.15 lakhs pertaining to the period 1984-85 onwards was awaiting adjustment (March 1992). CSIR stated in February 1993 that as on 30th November 1992 the amount awaiting adjustments was 14.51 lakhs.

IIP stated (February 1993) that efforts were being made to settle the outstanding items.

12.3 Central Building Research Institute - audit review

12.3.1 Introduction

Central Building Research Institute (CBRI) was established in 1951. Objectives of the Institute inter alia are:

- examination of building materials in common use and the methods of applying them with a view to effecting economy and improvement wherever practicable,

- dissemination of useful information and fostering scientific spirit and out-look in the building industry in India and

- preparation of standard of materials and codes of practice for various aspects of building construction.

12.3.2 Organisational set up

The Institute has seven research divisions. Besides there is also an Information and Extension Division to look after research needs of scientists and to help in utilisation of the results of research. In addition, it has set up a network of extension centres.

CBRI's annual research programme is formulated by an Executive Council representing different professional interests and by a Scientific sub-committee consisting of specialists in various subjects.

12.3.3 Scope of audit

Accounts of CBRI are audited under Section 20 (i) of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971. The present review covers CBRI's activities during 1985-92.

12.3.4 Highlights

Manpower

- Eighty four technical posts were declared surplus by CBRI as on March 1985. Subsequently, another 150 technical posts became surplus as a result of projects being completed/ merged or kept in abeyance as on March 1992. No adjustment had been made in the sanctioned strength with regard to the declared surplus. Ninety one technical/non technical posts which were transferred from Structural Engineering Research Centre to CBRI in January 1989 were not being reflected on the strength of CBRI. (Para 12.3.5)

Operations

- Out of the 100 projects undertaken by CBRI during 1985-92, only 67 were completed and Rs 709.9 lakhs (of the total expenditure of Rs 2549.35 lakhs) were spent on the completed and the ongoing projects. No account of the remaining expenditure was available with CBRI. Five R & D projects were continuing beyond their dates of completion (March 1989 and March 1990) for want of infrastructure and equipment. During 1985-87, no project was undertaken but five were dropped. Of 231 consultancy projects that were undertaken, 225 were completed and six dropped. During 1985-91, CBRI was interested in taking up more and more consultancy projects rather than R & D and sponsored projects. The steering group met in March 1989 to prepare detailed project profile for the Thrust Area Project on "Low cost/alternative building materials and components" though the project had commenced two years earlier. The project failed to meet targets. Outputs were not clearly stated and were unrelated to targets and claims were invalid.CBRI had taken up 35-point Action Plan with an estimated amount of Rs 309 lakhs, out of which Rs 56 lakhs were spent during April 1990 to June 1992. Technologies taken up for the Action Plan were no different from what had been tried to be transferred for use by the same target group of beneficiaries during the period 1983-90. (Para 12.3.7)

- **Out of 108 processes/technologies developed since its inception, eight processes/technologies were transferred direct to industries and 66 processes/technologies were transferred through NRDC. Remaining 34 processes/technologies developed by CBRI were not accepted by the industries partly because improved methods were already available and partly because same processes/technologies developed had become obsolete. The feed back studies indicated that the knowhow developed by CBRI was not economical, did not assist in competing in the market, did not upgrade the standard of the product using industrial raw material and no follow up action was provided by CBRI. (Para 12.3.8)**

- **CBRI had not arrived at the prime cost of the fabricated items. Contrary to the rules, fabricated items costing Rs 1000 or more were not classified as assets and accounted for in the stock ledgers and also not reflected in the balance sheet. While Rs 42.41 lakhs were paid as salary, the cost of the total fabricated items was Rs 22 lakhs.(Para 12.3.9)**

- **Equipment valuing Rs 13.98 lakhs had been procured but not utilised. CBRI imported equipment on CIF rather than the stipulated FOB basis resulting in avoidable out flow of foreign exchange of Rs 7.22 lakhs. Stores/assets with book value of Rs 3.19 lakhs declared unserviceable were yet to be disposed of and assets with book value of Rs 19.91 lakhs were lying unused since 1986. (Para 12.3.10)**

12.3.5 Manpower

CBRI had a sanctioned strength of 541 technical and 162 non-technical posts against which 516 technical and 149 non technical personnel were in position as on March 1992.

Eighty four technical posts were declared surplus as on March 1985 as a result of completion, merger and dropping of 30 projects. No adjustment had been made in the sanctioned strength with regard to the declared surplus and no effort had been made to identify further surplus posts (July 1992).

Consequent upon the decision to relocate the Structural Engineering Research Centre (SERC) from Roorkee to Ghaziabad , Council of Scientific and Industrial Research (CSIR) opened (February 1988) a zonal centre of SERC at Roorkee, which was merged with CBRI in January 1989, in order to accommodate those employees who were unwilling to move to Ghaziabad. The staff of Roorkee Centre of SERC (63 technical and 28 non-technical) brought over to CBRI were to constitute the Structural Engineering division of CBRI. They were, however, not being reflected on the manpower strength of CBRI.

12.3.6 Receipt and Expenditure

The Institute is mainly financed through funds released by CSIR. The provisions of funds and expenditure incurred during the seven years 1985-92 are indicated below:

Year	Grants received	Receipts from Sponsored/Consultancy projects	Misc. receipt	Expenditure from CSIR grant	Expenditure on Sponsored/ Consultancy projects
				(Rs in lakhs)	
1	2	3	4	5	6
1985-86	268.72	64.66	16.84	268.72	34.58
1986-87	308.62	42.03	11.75	308.62	19.72
1987-88	322.47	138.98	16.28	322.46	72.12
1988-89	344.00	156.58	21.06	344.00	135.52
1989-90	454.00	257.22	21.26	454.00	140.10
1990-91	436.50	56.09	17.35	436.50	77.41
1991-92	426.00	158.85	49.46	426.00	112.85

There was no system for projectwise accounting of expenditure making it difficult to monitor the expenditure on each project.

In respect of sponsored/consultancy projects,the total receipts exceeded the total expenditure as on March 1992 by Rs 282.71 lakhs.

Further, Rs 28.73 lakhs was outstanding towards sponsored/consultancy fee from 10 agencies as on March 1992.

12.3.7 Research Projects

A. Planning and monitoring

Research activities of CBRI have been divided into various disciplines. The overall review of identification of thrust areas suggested by different divisional peer groups is done by the Research Council and reflected in the annual report and annual plan document.

It was observed that a detailed project report giving the full description and period required for completion, expenditure to be incurred, physical and financial mile stones was not prepared for each project rendering any meaningful appraisal or monitoring of the project difficult.

B. Seventh Plan objectives

The areas of research approved by the Research Council (RC) for the Seventh Plan were :

(i) Building material, **(ii)** Foundation, **(iii)** Urban housing, **(iv)** Rural housing, **(v)** Fire research, **(vi)** Energy consideration in building **(vii)** Building for high altitudes, **(viii)** Building for imparting education and **(ix)** Building to mitigate disaster due to cyclones and floods.

The project "Development of innovative measures of land slide control and feed back studies" costing Rs 31.86 lakhs was approved by R C in April 1989 eventhough the project was not directly within the mandate of CBRI.
Before taking up the projects for Seventh Plan, position of the 30 projects undertaken during the Sixth Plan were reviewed revealing that eight projects had been completed, fourteen low priority projects dropped and other eight low priority projects merged with ongoing projects of higher priority. Information regarding expenditure on the dropped/merged projects was not made available to Audit.

C. In-house projects

Given below is the position of in-house projects undertaken during 1985-92:

Year	Number of projects in hand	New projects undertaken	Projects completed	Projects kept in abeyance /merged	Balance
1985-86	19	4	13	-	10
1986-87	10	20	10	5	15
1987-88	15	13	7	-	21
1988-89	21	7	6	-	22
1989-90	22	18	10	2	28
1990-91	28	14	8	2	32
1991-92	32	5	13	-	24
Total		81	67	9	

CBRI had completed only 67 projects out of the 100 projects taken up during 1985-92. Total expenditure of Rs 2549.35 lakhs was expected to be incurred on the 100 projects. Rs 667.48 lakhs were spent on 64 completed projects, Rs 33.90 lakhs on the five projects merged and Rs 7.53 lakhs on three projects kept in abeyance. No account of expenditure on remaining projects, completed or ongoing, was available with CBRI.

For extension beyond the target date of completion of the five R&D projects, which were still continuing even after expiry of their stipulated completion period in March 1989 and March 1990 approval of RC had been obtained from time to time. The delay was attributed to non-availability of infrastructure and equipment. The delays indicated faulty planning and monitoring.

RC took a serious view, in August 1991, of non-submission of detailed project reports, by the project leaders, at the conclusion of the projects. With a view to assess the extent of delay in preparation of detailed project reports, CBRI was requested in September 1992 to intimate details of final completion reports prepared in respect of the projects completed during 1985-92. The information was not provided to Audit. Test check, however, revealed that in one case it took four years in finalising the report and in three cases the final reports were still under process (September 1992).

D. Sponsored projects

Projects wholly funded by the clients with specified R&D objectives and well defined expected project output/results, generally culminating in generation of intellectual property, are classified as sponsored projects. Position of such projects undertaken during 1985-90 was as under:

Year	Number of projects in hand	New projects undertaken	Total	Projects completed	Projects dropped	Balance
1985-86	-	-	20	-	1	19
1986-87	19	-	19	2	5	12
1987-88	12	4	16	6	-	10
1988-89	10	5	15	3	-	12
1989-90	12	5	17	11	-	6

The particulars for the years 1990-91 and 1991-92 were not furnished to Audit.

CBRI had undertaken 14 new sponsored projects during the period 1985-90. CBRI was requested to intimate the expenditure on completed and dropped projects; the information has not been supplied to Audit.

E. Consultancy projects

Consultancy services comprise scientific, technical, engineering or other professional advice/assistance based on available knowledge/expertise of the laboratory. Consultancy normally envisages generation of intellectual property and/or substantial/experimental work. The scientific staff deployed in consultancy projects were entitled to receive honorarium.

Position in respect of consultancy projects undertaken during 1985-91 was as under:

Year	Number of projects in hand	New projects	Total	Projects completed	Projects dropped	Balance
1985-86	-	-	63	25	2	36
1986-87	36	30	66	35	1	30

1987-88	30	62	92	38	-	54
1988-89	54	40	94	19	-	75
1989-90	75	29	104	66	2	36
1990-91	36	7	43	42	1	Nil

Particulars of consultancy projects for the year 1991-92 was not available with CBRI.

CBRI had undertaken 231 consultancy projects and successfully completed 225 and dropped only six projects during the period. This indicated that CBRI placed more emphasis on consultancy projects rather than in-house and sponsored projects. RC observed in their meeting held in August 1991 that taking up too many consultancy projects might effect R & D output and instead sponsored research should be welcomed which not only would generate more external funding but would also nurture R & D.

F. Thrust Area project on Low Cost/Alternative Building Materials and Components

The CSIR Thrust Area project on "Low cost/alternative building materials and components" was launched with focus on development of alternative materials and components to suit different geoclimatic situations and to bring to the stage of field implementation through commercial exploitation in building construction and mass housing programme. The objective of the project was development of technologies in place of portland cement, sintered flyash aggregate, production of autoclaved calcium silicate bricks and blocks, glass fibre silicate gypsum composite materials, light weight polymer concrete and studies on durability of cement concrete and other building materials.

Director General (DG), CSIR constituted, in March 1989, a steering group under the Chairmanship of the Director, CBRI to discuss the functions and preparation of the detailed project profile. As a result of the discussion, six areas and eleven sub-areas were identified. A number of laboratories like CBRI, Central Mechanical Engineering Research Institute, Regional Research Laboratories, Structural Engineering Research Centres etc were to participate together on these projects. Out the total cost of Rs 925.10 lakhs CBRI's share of expenditure was Rs 599 lakhs. Of this, Rs 311 lakhs had been spent upto March 1992 and another Rs 66.30 lakhs were estimated to be spent by March 1995. There was

no record showing how the detailed costing of these projects had been done. Although the projects had commenced in 1987, the steering group met in March 1989 only to prepare the detailed project profile.

RC had observed (March 1992) that all the projects had failed to meet their targets, the project outputs were neither clearly stated nor were related to targets, and claims were invalid.

G. Implementation of S&T Action Plan

Government of India announced a 35 - point Action Plan in various sectors of development which, inter alia, stated that the S&T programmes would be reviewed to provide emphasis on the needs of rural society especially in the areas of poverty alleviation, water management and land use.

Based on the review of S&T activities of various scientific departments, the Ministry of Science and Technology had identified projects and activities to be undertaken as part of the implementation of the Action Plan for S&T sector. The project/programme identified for CSIR under "Poverty alleviation and improvement of rural economy" was "Low cost building materials and housing". The project was intended to set up low cost demonstration units in different zones through use of local materials, low cost sanitation system, fabricated walling and roofing components and energy efficient lime kilns and to organise integrated training programmes for engineers, masons etc on production and utilisation of alternative building materials and for construction of low cost housing and rural roads.

Twelve institutions, including seven belonging to CSIR, were involved in this project for demonstration of "low cost building materials and components" with specific responsibilities. Director of CBRI was made the project co-ordinator.

The project was sought to be implemented through construction of demonstration units by involving State and voluntary organisations through use of local materials/technologies.

Targets for 1991-92 were as under :

- 100 demonstration units,
- six integrated training programmes,
- 24 exhibitions,
- six publications in regional languages and
- six training courses on Rural Housing.

An estimated amount of Rs 309.00 lakhs was to be spent during April 1990 to March 1995 out of which Rs 56.00 lakhs were spent during April 1990 to June 1992.

It was indicated by CBRI that 112 demonstration units had been established, 7500 houses constructed at a cost of Rs 375 lakhs effecting savings of Rs 20 lakhs.

During 1991-92, 564 persons were imparted training, out of which 70 belonged to SC/ST and 40 were women and 454 were shown as general. There was no way of determining whether all the 454 belonged to economically weaker sections, as required under the objectives of the Action Plan.

Technologies taken up for demonstration and extension, under the Action Plan were not different from what had been tried to be transferred for use by the target group of beneficiaries during the period 1983-90. It is not clear why the same old technologies were proposed to be popularised among the same target group when earlier such an effort had not met with success.

H. Overlapping research on "Flyash sand lime brick technology"

Both Central Fuel Research Institute (CFRI), Dhanbad and CBRI had independently developed processes for making building bricks using flyash. These processes were patented in April 1974 (CBRI) and September 1974 (CFRI). Both the patents were assigned to National Research & Development Corporation (NRDC), New Delhi for commercial exploitation. NRDC had licensed the CFRI as well as the CBRI process to two different parties and none of the two parties had started commercial production.

CFRI had suggested sharing of royalty between the two institutes in respect of the two processes. CBRI had not agreed on the ground that the work on the utilisation of flyash as building material had been their concern for the last ten years.

DG, CSIR observed in March 1978 that the two patents referred to above related to two different inventions and there was no question of conflict of processes of the two patents if the same were licensed to different parties. In audit, it was observed that for research related to this process neither CFRI nor CBRI had verified, before taking up the research project, whether similar R&D activity was being undertaken in another CSIR institute though they were required to do so.

Further, the R & D wing of National Thermal Power Corporation (NTPC) have also independently developed, the technology for flyash bricks.

I. Navodaya Vidyalaya project

Under this project beginning in September 1986, CBRI was identified as a nodal agency for planning and designing 430 school complexes throughout India by March 1991. However, no Memorandum of understanding (MOU) or agreement had been signed by Navodaya Vidyalaya Samiti and CSIR(CBRI) even after a period of more than four and a half years.

CBRI had targetted to complete 350 soil investigations and designs by December 1990 for which it was to receive Rs 570 lakhs. However, till September 1992, only 276 sites had been identified and soil investigations had taken place only on 231 sites. Architectural designs, layout plans, foundation structural designs and bills of quantities have been completed in 230 sites.

For this work, CBRI had received Rs 542 lakhs and already incurred an expenditure of Rs 343 lakhs as on March 1992. The balance (Rs 199 lakhs) had been retained with CBRI. Of this, Rs 10 lakhs had been credited to Director's fund, Rs 18.11 lakhs distributed as honorarium to staff and Rs 10.03 lakhs credited as 1/3rd share of CSIR.

12.3.8 Commercialisation of technologies developed

An annual review of intellectual property licensed, including follow up with the licensee, has to be conducted and technological modifications/developments and change in terms and conditions of licensing considered. Intellectual property of CBRI includes

patents, copyrights, registered design and computer software.

One hundred and eight processes/techniques had been developed by CBRI since inception, out of which 66 processes had been transferred to industry through NRDC and eight processes developed during the period from 1964 to 1980 had been directly transferred to industry. Out of 66 processes transferred to industry upto March 1992, four processes have been withdrawn for reasons like high cost, much improved mechanical methods already available and processes having become obsolete and the remaining ones were not accepted by the industry due to availability of other cost effective methods and for economic reasons. Fourteen processes/techniques were developed during 1985-92, out of which only three processes have been transferred to industry.

Only two feed back studies for intellectual property licensed directly by CBRI to the industry were carried out during the last five years. Twenty three entrepreneurs responded to the feed back study, out of which eleven (50 per cent) had shown concern stating that know-how developed by CBRI was not economical and difficult to compete in the market, product does not come upto the standard with industrial raw material, there is no back up/ follow up action by CBRI to assist the entrepreneurs, the type of design developed is not useful to the building designers and architects in the area. In the case of rapid setting lime plaster technology, even government departments refused to use the product and advised CBRI not to 'misguide' anymore new entrepreneurs by releasing know-how which has no scope at all. In case of solar water heater (large and domestic size), the manufacturer stated that the know-how is not required due to high price when compared to electric heater.

CBRI developed an equipment for mechanised casting of core unit at a cost of Rs 1.67 lakhs for Delhi Development Authority (DDA) and a separate set was fabricated for Housing Board, Bhopal. The equipment was used on limited scale. The private builders could not come forward on account of higher initial investment in the equipment. No need was felt necessary for raising/updating the design of the equipment thereby resulting in infructuous expenditure of Rs 1.67 lakhs.

Thus, technology developed at CBRI was not receiving positive response in the industry after its transfer and trial.

12.3.9 Workshop Accounts

In the workshop at CBRI 3029 jobs were undertaken at a cost of Rs 22.07 lakhs (which included direct labour, direct material and overheads) during the period 1985-92 for fabrication, repair of various articles, instruments etc. However, salaries paid to staff of the workshop during the same period amounted to Rs 42.41 lakhs. It was also observed that majority of the jobs were hired out to private agencies by the concerned scientists.

CBRI had not arrived at the prime cost of the fabricated items taking into account the elements of (a) direct material (b) direct labour and (c) overheads. Workshop stores were not identified as consumables and non-consumables before using them in the fabricated items. As per CSIR instructions, cost of a fabricated item, costing Rs 1000 and more, was to be classified as asset and routed through the Central Stores and accounted for in the stock ledgers. Stores fabricated by the workshop being an asset, should be fully accounted for and reflected in the balance sheet. Not even a single fabricated store item has been accounted for in the balance sheet since the inception of CBRI.

12.3.10 Stores and purchase

(i) Non-utilisation of mobile exhibition van

Extension Division of CBRI had purchased a "Tata Diesel Vehicle" at a cost of Rs 2.86 lakhs in December 1989. The vehicle was required for activities under the 35-Point Action Plan. For fabrication of a mobile van a job order was placed for Rs 2.18 lakhs with the delivery period of three months from the date of receipt of chassis in the workshop of the firm. The van was received by the firm in May 1990. The fabricated van was received back in the Institute in February 1992. An application made for exemption of fee for a national permit made to the Transport Commissioner Lucknow is yet (December 1992) to be allowed and the mobile van could not be used for exhibitions/demonstrations.

Thus, Rs 5.04 lakhs had idled for almost three years now (January 1993) besides hindering the activity of exhibitions/demonstrations and transfer of technology programmes under the Action Plan.

(ii) Purchase of Gas chromatograph

A purchase order was placed in February 1988 for import of one complete set of "Shimadzu gaschromatograph" at a cost of Japanese Yen 3373793 (Rs 4.00 lakhs) excluding agency commission. The equipment was required for investigation of LP Gas and development of automatic explosion separation system for safety plants and buildings. Director, CBRI accorded approval for expenditure of Rs 4.45 lakhs in February 1988. The equipment was received in CBRI in July 1988 and installed in November 1990 after a lapse of 16 months from the date of receipt as the consignment was short of four capillary columns which were to be used for analysis of hydrocarbons. An amount of Rs 3.94 lakhs was incurred on procurement of the equipment which could not be used for the project for which it was procured and the project has been kept in abeyance for want of the capillary columns.

(iii) Unfruitful expenditure on imported equipment

CBRI had imported a complete Durst Colour Enlarger with accessories (i.e Durst laboratory, processor and colour copy 350 dia duplicator) for photo printing purpose at DM 42776 (Rs 3.72 lakhs). The equipment was received in CBRI in May 1990.

The equipment could not be installed as the receptacle connector, on which the drying heater was placed, was totally broken and needed replacement. The damaged part was replaced free of cost in May 1991, still the equipment could not be commissioned for want of a service manual. As a result, CBRI had entered into an agreement with a private firm for photo printing jobs rendering the expenditure of Rs 5.00 lakhs unfruitful.

(iv) Avoidable outflow of foreign exchange

General Financial Rules require that all contracts of purchases involving import of material from abroad should as a rule provide for purchase on FOB basis. Notwithstanding the fact that these rules have been adopted by CSIR and applied to all its institutes/

laboratories, CBRI had been making these purchases from abroad on CIF basis with the result that payment on account of insurance and freight etc on imported goods had been made in foreign exchange in addition to the cost of material. This resulted in an avoidable outflow of foreign exchange of Rs 7.22 lakhs during 1986-89.

(v) Physcial verification of stores

Physical verification of stores is required to be conducted annually by a committee constituted for the purpose by CBRI whereas the CSIR stores verification group is to conduct verification of stores once in two years. The physical verification of stores was not being done annually. The CSIR stores verification group had conducted physical verification of stores in 1981 and again in August 1990 after a lapse of nine years. During test check in audit, the following came to notice:

(a) The CSIR physical verification group had observed in August 1990 that a number of items were lying in stores for more than ten years and some items were not used since procurement and that CBRI has not taken any action with regard to the shortages/discrepancies pointed out in 1981.

(b) Assets figures in the balance sheet could not be totally relied upon because they had not been reconciled with the progressive totals of the asset registers maintained in the stores.

(c) Nine hundred and thirty nine items of CBRI stores/assets with book value of Rs 3.19 lakhs declared unserviceable were yet to be disposed of as on March 1992 despite Government of India's decision to minimise the time lag between the declaration and actual disposal of stores to ensure that such stores fetch a good return and not occupy valuable storage space unnecessarily.

(d) Forty five asset items of erstwhile SERC (Roorkee) with book value of Rs 19.91 lakhs were lying unused since 1986, but they had neither been used nor their serviceability determined.

12.3.11 Unadjusted advances and other dues

CBRI has been making advance payments to officials, private parties and government organisations on account of

TA/LTC, local purchases and supply of materials and equipment. An amount of Rs 40.03 lakhs was awaiting adjustment as on July 1992 the details of which were as under :

Year	Local Purchase	TA/LTC	Private Parties	Government Organisations	Total
			(Rs in lakhs)		
1983-84	0.05	-	-	-	0.05
1984-85	0.01	-	0.04	0.01	0.06
1985-86	0.01	-	0.00	0.08	0.09
1986-87	0.30	0.12	0.08	-	0.50
1987-88	0.16	-	1.10	0.70	1.96
1988-89	0.58	-	3.68	0.71	4.97
1989-90	2.73	0.17	5.01	1.62	9.54
1990-91	1.73	0.54	6.93	0.64	9.93
1991-92	3.01	2.35	6.94	0.73	13.03
Total :	8.58	3.18	23.78	4.94	40.03

It was observed that an amount of Rs 11.27 lakhs (paid for the period 1987-92 as contingent and TA/LTC advances) is recoverable from the officials of CBRI. Contingent advances are paid to the staff to meet immediate expenditure which should be expeditiously adjusted and unspent balance returned. Similarly TA/LTC adjustment bills should be submitted within a specific period. An amount of Rs 11.76 lakhs paid as advances to the staff had not been adjusted for period ranging from one year to six years.

Similarly Rs 23.78 lakhs was outstanding against advances paid to private parties and Rs 4.94 lakhs outstanding against government organisations since 1987-88 onwards.

Non-maintenance of recovery register of licence fee, water and electricity charges payable by the staff has resulted in no verifiable record for the outstanding amounts recoverable from the staff. A case was noticed in which an amount of Rs 1.19 lakhs is outstanding against the staff, who had retained the accommodation at Roorkee evenafter their transfer to SERC (Ghaziabad) and IIP (Dehradun). CBRI stated that in one case the matter is pending with Central Administrative Tribunal (CAT) and the matter of realisation of dues from others is under active consideration.

12.3.12. Bank reconciliation

CBRI has a bank account with State Bank of India, CBRI Campus, Roorkee. The bank reconciliation has been done upto July 1992, but the adjustment/settlement of discrepancies/ differences in some cases are awaited.

Depicted below is the amounts awaiting reconciliation between cash book and bank statement:

No. of cases	Amount (Rs in lakhs)	Nature of discrepancy
28	26.13	Shown in Bank Statement but not in Cash Book.
39	10.98	Shown in Cash Book but not in Bank statement.
94	32.93	Shown in bank statement, but not in Cash Book.

It was observed that the reason for majority of discrepancies was that the bank directly debited/credited amounts in respect of letters of credit (LC) opened for import of equipment and spares.

12.4 Central Mechanical Engineering Research Institute -audit review

12.4.1 Introduction

Central Mechanical Engineering Research Institute at Durgapur was established in February 1958 with the specific task of development of Mechanical Engineering technology through an effective and efficient scientific research of high value in the frontier technologies to keep at the cutting edge technological excellence and relevance both current as well as in the future years to come. Thus, Institute's main objective is to provide assistance to Mechanical Engineering industries in the form of feasibility studies, research, training consultancy etc for:

- New Product and Process development
- Product and Process innovation
- Import substitution and export promotion
- Waste recovery and utilisation
- Increasing productivity and reducing cost
- Quality control of products and materials
- Standardisation etc

12.4.2. Scope of Audit

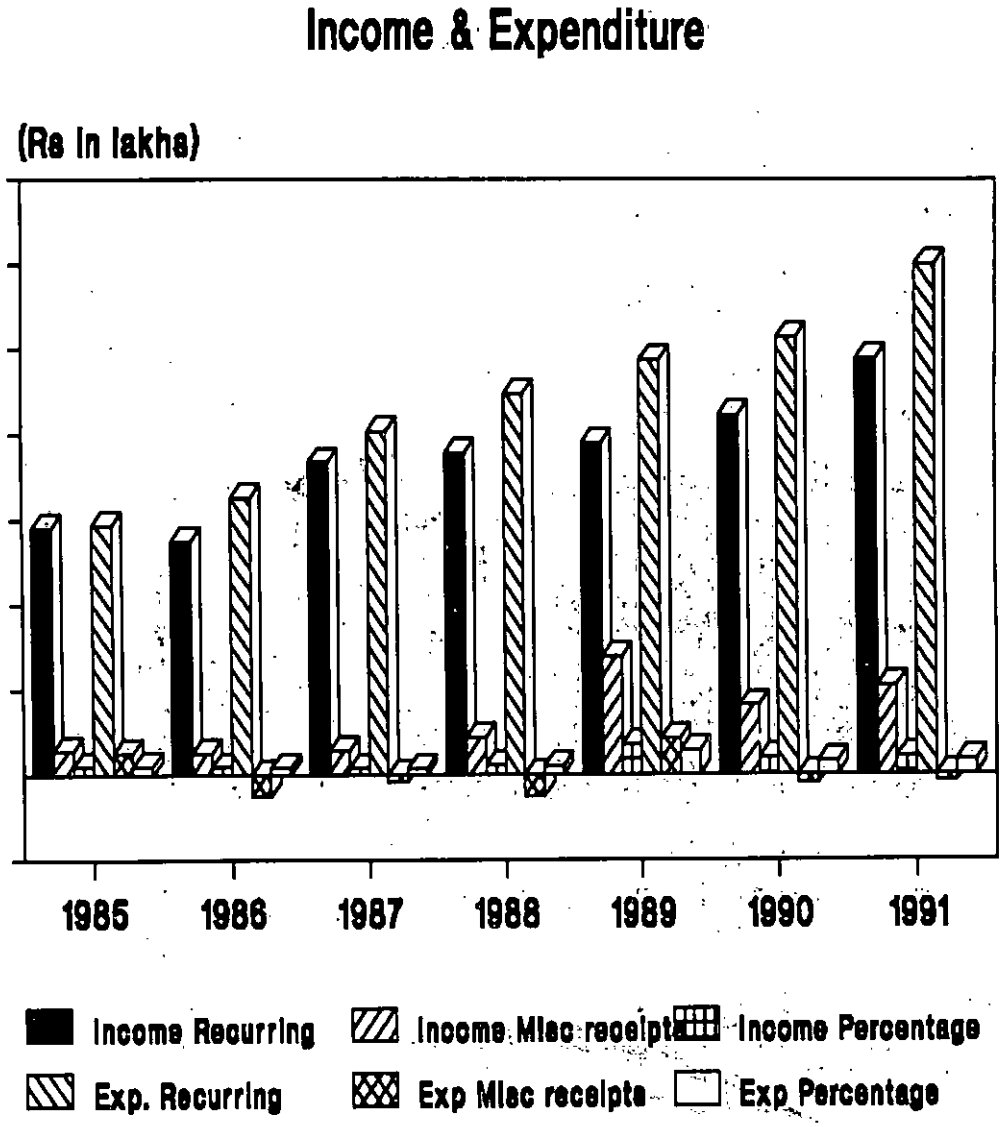
The Institute is audited under section 20 (1) of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971. The present review on the working of the Institute covers the period from 1985-86 to 1991-92.

12.4.3 Income and expenditure

The details of income and expenditure of the Institute for the five years 1985-92 were as under:

Income	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92
				(Rs in lakhs)			
Recurring grant from CSIR	290.61	274.73	367.53	377.60	389.79	422.22	487.47
Misc.receipt of the Institute	28.53	24.97	27.73	43.30	138.61	81.06	103.81
	319.14	299.70	395.26	420.90	528.40	503.28	591.28
Percentage of revenue raised by the Institute to CSIR grant received by it.	9.82	9.08	7.54	11.47	35.56	19.20	21.22
Expenditure							
Recurring	293.40	325.51	403.39	446.91	486.70	513.46	599.24
Excess of Income over Expenditure	25.74	(-)25.81	(-) 8.13	(-)26.01	41.70	(-)10.81	(-) 7.96

Percentage of revenue raised by the Institute to its total recurring expenditure	9.72	7.67	6.87	9.69	28.48	15.79	17.28



% of revenue raised by Instt to CSIR grant recovered by it

Council of Scientific and Industrial Research (CSIR) had issued directives to its constituent units to earn cash flow from external sources to cover at least 33 1/3 per cent of its recurring expenditure. As is evident from the above table the Institute fell short of attaining this objective.

The Institute received grants from Government of India through CSIR amounting to Rs 32.74 crores during the period 1985-92. It also received Rs 31.94 crores during the same period from other sources including funds for Sponsored Projects. The expenditure incurred on various accounts during these years amounted to Rs 55.40 crores.

12.4.4 Highlights

- **Twenty four out of 61 in-house projects undertaken during 1985-92 were terminated/dropped. Analysis of three such projects disclosed unfruitful expenditure of Rs 22.49 lakhs. There was time over-run of three to 20 months in respect of 4 out of 11 ongoing in-house projects as on 31st March 1992. (Para 12.4.5)**

- **There was no proper system of mid-term monitoring and evaluation of the projects and no evidence of any such review having been conducted after January 1987. (Para 12.4.6)**

- **There was no system for getting feed back from industry to whom the technology was transferred. None of the 14 processes developed at the cost of Rs 73.22 lakhs during September 1987 to September 1991 had been transferred to industry for commercialisation. Six processes were utilised by the Institute in its various in-house research and development (R&D) work. (Para 12.4.7)**

- **Number of scientific papers published had declined from 46 in 1985-86 to 16 in 1991-92. (Para 12.4.8)**

- **Equipment worth Rs 35.17 lakhs were lying unutilised for long period due to non-installation and the work for which they were procured, was hampered. (Para 12.4.9)**

- **Equipment and apparatus costing about Rs 41.88 lakhs were awaiting inspection and lying unaccounted for and unused since 1989. Un-serviceable stores worth Rs 56.94 lakhs and surplus stores worth Rs 18.33 lakhs were lying in stores for more than 10 years. (Para 12.4.10)**

12.4.5 Research Projects

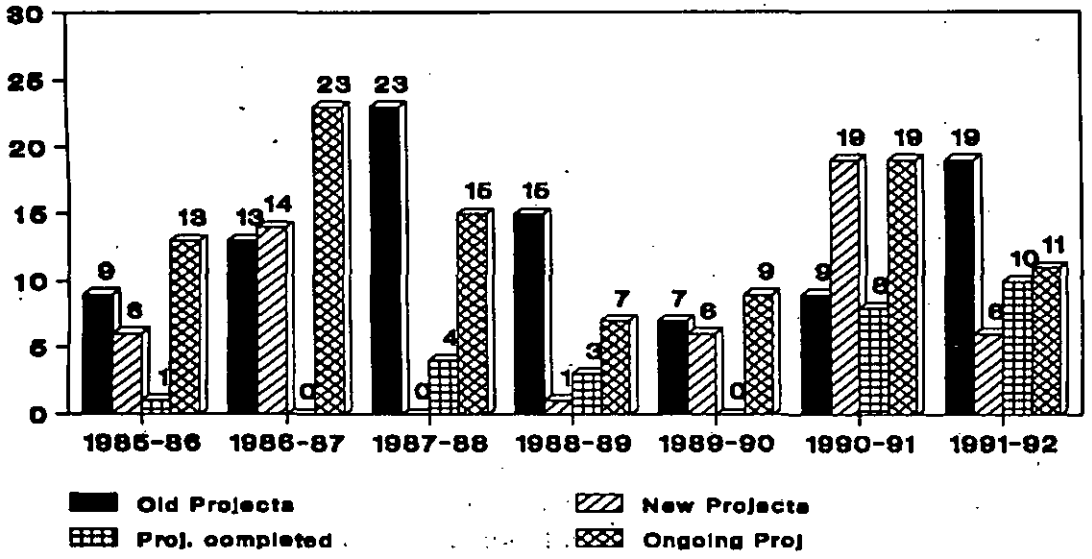
A. Projects undertaken fall into 3 categories i.e in-house, sponsored and consultancy. In-house projects were fully financed by the Institute whereas funds were provided by sponsoring agencies for the sponsored projects and consultancy fee was required to be realised from the parties concerned at the rates prescribed by CSIR for the consultancy projects.

B. In-house projects

The position of in-house projects undertaken by the Institute during the years 1985-92 was as under :-

Year	Projects carried over	New Projects undertaken	Total projects	Projects completed	Projects terminated/dropped	On-going projects
1985-86	9	6	15	1	1	13
1986-87	13	14	27	-	4	23
1987-88	23	-	23	4	4	15
1988-89	15	1	16	3	6	7
1989-90	7	6	13	-	4	9
1990-91	9	19	28	8	1	19
1991-92	19	6	25	10	4	11
Total	-	52		26	24	

IN-HOUSE PROJECTS



Of the 61 projects that the Institute undertook since 1985-86 including nine carried over from 1984-85, 26 projects were completed, 24 were dropped/terminated, leaving a balance of 11 on-going projects. There was time over run of 3 to 20 months on 4 out of the 11 ongoing projects.

Twenty four in-house projects were terminated/dropped by the Institute on the advice of Research Council for want of sponsorship, in-adequate commercial viability, poor market demand and such other reasons. In addition to the cases already been mentioned in the Report of the Comptroller & Auditor General of India, Union Government (Scientific Department) for the year ended 31st March 1990 in paragraph numbers 29,30 and 31, cases mentioned below also came to notice in test check:

(a) The project 'Computer Aided Design and Computer Aided Manufacturing' (CAD/CAM) application in machining centre was taken up in September 1987 with a team of 10 scientists at an estimated cost of Rs 32.50 lakhs. But the above project was terminated in the same month i.e. September 1987 for want of any sponsorship from industry. The robots purchased for this project in 1986 in

anticipation of their use for the project, at a cost of Rs 15.14 lakhs, were not utilised for the project.

CSIR stated (January 1993) that the project was not closed but was diversified to other fields and the robots were used as a central facility for R&D work in high tech areas. The facts, however, remain that the project for which the robots were purchased was discontinued and know-how developed from the in-house projects stated to have been taken afterwards with the use of the robots had not yet attracted sponsors. Expenditure of Rs 15.14 lakhs incurred in 1986 on this account thus did not yield any return.

(b) The project 'Design and Development of Light Weight Chassis and Body' was taken up in January 1987 with seven scientists at an estimated cost of Rs 14 lakhs. The stipulated dates of commencement and completion of the project were January 1987 and February 1988 respectively. The project duration was further extended upto March 1990. However, it was terminated in December 1988 due to very poor market demand and acceptability of the product. Expenditure of Rs 4 lakhs incurred (upto December 1988) towards pay and allowances of the staff engaged with the project became unproductive.

While accepting the facts CSIR stated (January 1993) that the technology developed under this project has been utilised in other projects. However, details of such 'other projects' were not indicated.

(c) The project 'Automatic Cementing and Folding Machine' was taken up by the Institute in July 1986 with five scientists and four assistants at an estimated cost of Rs 7.17 lakhs. Anticipated date of completion of the project was December 1988. The period was extended upto June 1989. But the project was dropped in November 1988 due to lack of sponsorship and doubtful market potential. The expenditure of Rs 3.35 lakhs (upto November 1988) incurred on this account was unproductive.

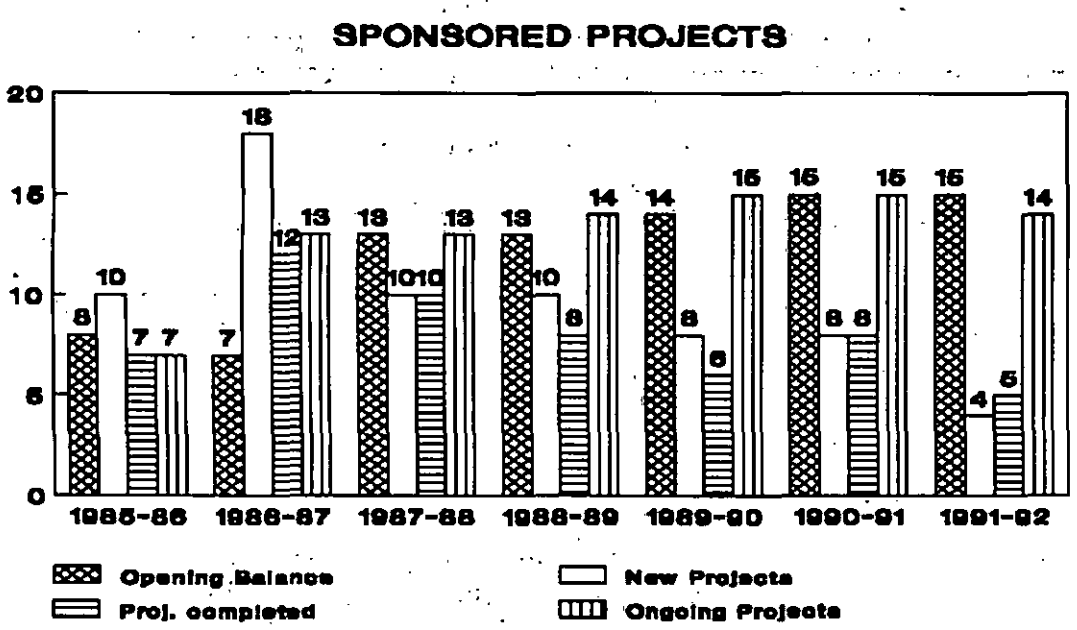
CSIR stated (January 1993) that the Automatic Cementing and Folding Machine was transferred to Central Leather Research Institute (CLRI) Madras in May 1992 for use there.
Had the market survey to find interest of possible users in respect of such projects been done well in advance,

unfruitful expenditure as mentioned above could have been avoided.

C. Sponsored projects

The position of sponsored projects undertaken by the Institute during 1985-92 was as under:-

Year	Opening Balance	New Projects undertaken	Projects completed	Projects closed	Ongoing projects dropped
1985-86	8	10	7	4	7
1986-87	7	18	12	-	13
1987-88	13	10	10	-	13
1988-89	13	10	8	1	14
1989-90	14	8	6	1	15
1990-91	15	8	8	-	15
1991-92	15	4	5	-	14
Total		68	56	6	



Thus, during the years 1985-92 the Institute executed 76 sponsored projects of which 56 were completed and six

were abandoned/discontinued leaving a balance of 14 projects which were continuing. It may be added that over 98 **per cent** of the projects were sponsored by different departments/organisations of the Government of India. There was hardly any response from the industry. The sponsorship from the Government of India was also declining which was attributed by the Institute to "change in Government policy in the economic and industrial front".

Of the abandoned sponsored projects, two viz (i) Fabrication of honey processing plants sponsored by Khadi and Village Industries Commission, Bombay at an estimated cost of Rs 15.30 lakhs and (ii) Robotics Application in Steel Structural shop for profile cutting by Oxyacetylene flame torch on M.S. Plate sponsored by M/s Bhilai Steel Plant at an estimated cost of Rs 22 lakhs were abandoned after continuing work for some time due to lack of interest shown by the sponsors. Cost incurred by the Institute out of its own funds in respect of these dropped projects was not indicated though asked for.

Costs of sponsored projects are to be recovered from the sponsors on actual basis. In the absence of records showing actual costs on these projects, it was not clear as to how the full costs were being recovered.

CSIR stated in January 1993 that these projects were treated as closed with the consent of the sponsor. In respect of project (ii) above, the sponsor had paid Rs 2.50 lakhs towards the charges to the extent of the work done. CSIR was silent about whether there were users of technology developed under these projects, the details of total expenditure incurred and the amount recoverable from the sponsor.

D. Consultancy projects

The Institute carried over one consultancy project in 1985-86 which was completed in that year and two consultancy projects were taken up and completed in 1988-89. No project was taken up thereafter.

12.4.6 Monitoring and evaluation

In terms of CSIR's directives, each Institute was required to set-up a Project Monitoring and Evaluation (PME) Cell inter alia for monitoring and evaluation of

the on-going projects at regular periodical intervals. Although a PME cell was set-up by the Institute within the Technical Information and Liaison division, the project monitoring and evaluation was last conducted by the cell in January 1987 and suggestions communicated to the concerned project leader in February 1987. Thereafter, the above practice was discontinued by the cell. The work of Technical Information and Liaison division was re-organised and staff redesignated in the seventh meeting of the Research Council (RC) held in September 1991. No mention was made in the re-organised set-up of the division about the work of PME cell being included in this division. No internal committee was set-up by the Institute for the purpose either.
CSIR stated (January 1993) that the monitoring and evaluation of the project was carried-out by RC and by the Director himself. The reply did not explain why CSIR's instructions about PME Cell were not being followed by the Institute. Further the Institute did not furnish reports arising from evaluation and monitoring carried out by the Director though asked for by Audit. Costing of the in-house projects was not being done and there was no mechanism to control the expenditure on these projects.

12.4.7 Utilisation of research results

Know-how developed in 14 in-house projects completed during September 1987 to September 1991 at a total estimated cost of Rs 73.22 lakhs were not released to any industry. The Institute, however, 'utilised' the knowledge acquired in six other in-house projects for their own research and development work.

The information regarding utilisation of know-how/system developed in three consultancy projects completed during 1985-92 was not made available as there was no feedback.

The Institute had no arrangement to get feed back from user industry about the technologies developed by the Institute and adopted by them for commercialisation. CSIR intimated (January 1993) that a technology Marketing Group has been created to exploit CMERI technology and watch reaction of the user industries after commercialisation.

12.4.8 Publication of Research Papers

The details of number of papers published, manpower engaged etc during 1985-92 are as under:

	1985-86	86-87	87-88	88-89	89-90	90-91	91-92
(a) Number of Research Paper Published	46	30	33	20	12	15	16
(b) Scientists engaged				89	93	97	123

The number of papers published had declined considerably from 1985-86 level despite increase in number of scientists.

There was no system of evaluation of the papers published and thus the quality of papers published could not be assessed. CSIR stated (January 1993) that the main thrust of the Institute was on hardware, product development, import substitution and quality control and hence the number of research papers may not be high.

12.4.9 Equipment not used

(i) Computer Work Station

The Institute placed a purchase order in January 1991 on an Indian firm for supply of one set of "Computer Work Station and other accessories" at a cost of Rs 16 lakhs which was debitable to the sponsored project of the Department of Ocean Development (DOD). Subsequently the Indian firm repeatedly informed the Institute during February - May 1991 that due to certain import restrictions and clearance procedure, P 2 graphic card (the vital part of the whole system) would be supplied at a later date at a cost of Rs 5 lakhs. The Institute took delivery of the system in May 1991 without the P2 graphic card. In March 1992 the firm finally communicated their inability to supply the P2 graphic card and offered another developed system to replace the existing one.

The scientist assigned to work on the machine opined that procurement of P2 graphic card was their prime consideration while placing the indent for the system, and in the absence of the card i.e. graphic accelerator

feature, the system's technical superiority over other similar system was absolutely lost, and consequently a number of projects related to graphical simulation work were diverted to lowend computers at the cost of speed and accuracy.

The system purchased without P2 card for Rs 11.00 lakhs could not be utilised in the DOD project for which it was procured. CSIR informed (January 1993) that card could not be obtained and the Institute withheld Rs 5 lakhs being the cost of the card.

(ii) Imported Accoustic Emission system

In July 1991 the Institute took delivery of an imported "Multichannel Accoustic Emission System with accessories" at a landed cost of Rs 24.17 lakhs against a DOD project for "Design and Development of a remotely operated underwater collecting unit with lifting system." The Indian agent of the foreign supplier visited the Institute in July, August and December 1991 respectively for its installation but some problems were noticed in the system while commissioning and the defects could not be rectified by them. In the meantime the original firm was taken over by another firm and the equipment costing Rs 24.17 lakhs could not be put to use since its procurement (January 1993).

Besides, the original purchase order of March 1991 envisaged a provision for free training of two scientists for two weeks at the manufacturer's works in U.S.A. The changed management of the firm refused (March 1992) to afford the required training facilities. Thus, the system even after its commissioning would not be utilised due to non-availability of trained personnel. The Institute have not arranged for training of scientists for operation of the system as yet (January 1993).

12.4.10 Stores

Equipment/apparatus costing Rs 41.88 lakhs purchased both from indigenous and foreign sources were awaiting inspection and lying un-accounted for and unused for 3-4 years. CSIR stated (January 1993) that receipt of stores is not posted in the ledgers till final inspection was over.

Unserviceable stores worth Rs 56.94 lakhs and surplus stores worth Rs 18.33 lakhs were lying in store for more than 10 years without being disposed of.

12.4.11 Accounts

(i) Unadjusted advances

Advance payment made to the officials, private parties and government departments towards travelling allowance, purchase of materials etc, amounting to Rs 45.41 lakhs was outstanding for adjustment as on 31st March 1992. Further, an amount of Rs 70.82 lakhs advanced for procurement of stores (both imported and indigenous) was lying outstanding for adjustment since 1981-82.

	Amount lying with				Advances for supplies of stores	
	Officials	Private parties	Govt. Deptt.	Local purchases	Imported	Indigenous
	(Rs in lakhs)				(Rs in lakhs)	
Between 5 10 years	Nil	1.51	0.79	Nil	4.89	0.28
Between 2 and 5 years	0.02	3.82	0.32	Nil	16.74	18.17
Upto 2 years	2.16	30.24	4.36	2.19	4.85	25.89
Total	2.18	35.57	5.47	2.19	26.48	44.34

CSIR intimated (January 1993) that outstanding amount of advance paid to officials, private parties and Government departments had come down to Rs 15.47 lakhs and an amount of Rs 37.83 lakhs has been adjusted on account of purchase of equipment leaving a balance of Rs 32.99 lakhs.

(ii) Abstract Asset Registers

The Institute held assets valued at Rs 1598.77 lakhs on 31st March 1992. The asset registers were incomplete and did not total up to the said figure. CSIR had decided in November 1986 that Abstract Assets Register (AAR) will be maintained by the Institute for reconciliation of the

figure shown in the accounts with that of AAR. But the ARR opened by the Institute was incomplete and did not add up to the value of assets nor were the differences analysed. Thus, the balance of assets shown in the accounts could not be verified with the AAR. CSIR stated (January 1993) that the reconciliation of figures was in progress.

12.4.12 Development of Low Horse Power Tractor

The Institute was working on the development of a low horse power tractor since 1978 suited to the needs of the developing countries. With a view to involve a manufacturer at the development stage, the Institute entered into an agreement with a firm in July 1982.

As per the agreement, the Institute would undertake development of design know how for manufacture of mini tractor on commercial scale in consideration whereof the firm would pay (i) an initial lump-sum fee of Rs 0.50 lakh and (ii) recurring royalty for a period of seven years from the date of first commercial despatch, on the sale of mini-tractors based on the know-how developed by the Institute at the rate of two **per cent** of the net ex-factory cost upto production of 2000 units, and at the rate of one and half **per cent** beyond production of 2,000 units per financial year. The agreement also provided that the Institute in collaboration with the firm shall arrange to make four prototype of the mini tractor and the firm shall pay to the Institute 50 **per cent** of the cost to be incurred for the design, development, fabrication and assembly of the four prototype testing at the Institute and at Tractor Training and Testing Station. The Institute shall complete development of the design know-how in collaboration with the firm and within a period of 48 months from January 1980. The period of completion of work could, however, be extended by such further periods as may be mutually agreed between them. According to the agreement, the work was to be completed by December 1983. However, one prototype only was built in February 1982 and that too was found defective in many respects during field trials. CSIR stated (January 1993) that the prototype was not defective but development of matching implements came in the way.

The firm expressed (February 1984) concern for the delay about the progress of the work and did not agree to the Institute's proposal for extension of time for prototype

development for reasons of change in market environment. They withdrew from the project with effect from December 1983 and claimed refund of Rs 0.50 lakh paid by them earlier as commitment fee, which, however, was not refunded by the Institute.

The Institute did not raise any claim on the firm for the cost of design, development, fabrication assembly as provided in the agreement, which was estimated to be Rs 4.73 lakhs upto October 1983.

After withdrawal of the firm from the project, the Institute entered into an agreement with another firm in August 1986 with the stipulation to provide them two copies of design and drawings of the tractor on payment of Rs 0.50 lakh and that the firm should pay to the Institute a recurring royalty of two per cent for seven years on ex-factory sale price of all tractors within the range of 15 to 28 HP.

The latter firm paid to the Institute Rs 0.50 lakh in August 1986. The Institute supplied to the firm first set of low HP tractor drawings in January 1988. The firm, however, intimated in June 1988 that they could not progress in the development of the tractor as complete set of drawings and some clarification of design were not submitted by the Institute to them.

The Institute ultimately closed the project in March 1990. No further development has taken place (July 1992).

The Institute stated in June 1991 that two prototypes of mini tractors were built and kept in laboratory for demonstration to prospective technology buyer. It was further stated (April 1992) that besides publicity for sale of know-how, collaborative work from different Indo-based firms were taken up indirectly and gain of Rs 6.90 lakhs made. The reply was not tenable as the ultimate objective of the project was not the fabrication of prototype of the laboratory model low horse power tractor but the development of design know how for the manufacture of LHP (Mini) tractor on commercial scale to suit the needs of the developing countries which was not achieved since the design know-how developed could not be put to commercial production. The actual expenditure incurred by the Institute on this account was not furnished to Audit.

CSIR stated (January 1993) that the first phase was design, drawing, material list and fabrication of first two prototypes, but only one prototype was fabricated and that the system of keeping the expenditure account of sponsored projects was not evolved at that time in the Institute.

12.5 Unplanned acquisition of land

In January 1984, Government of West Bengal offered to grant lease of four acres of land in Bidhannagar to the Council of Scientific and Industrial Research (CSIR) for a period of 999 years on payment of a salami of Rs 12000 per cattah for the purpose of accommodation of various institutions and laboratories of CSIR. A sum of Rs 29.04 lakhs was to be paid within 90 days of the date of offer and interest was payable for payments thereafter.

The lease agreement was executed by the Central Glass and Ceramic Research Institute (CGCRI), on behalf of CSIR, with the Government of West Bengal in June 1989 and possession of the land was taken over in May 1990. CGCRI incurred an expenditure of Rs 37.31 lakhs for acquiring the plot of land which included Rs 3.32 lakhs for interest on delayed payment. It was stated (February 1993) by CSIR that the amount of interest was paid under protest. CGCRI further spent Rs 6.99 lakhs, upto January 1992, for construction of boundary wall.

CSIR had no plan for establishment of institutions and laboratories on the leasehold land and instead it intended to utilise the major portion of the land for residential purposes. This was not agreed to by the Government of West Bengal as it was beyond the scope of the lease agreement.

While accepting the facts CSIR stated (February 1993) that it was now proposed to utilise the land for locating Regional Centres of different National Laboratories located in Calcutta which were housed in rented buildings.

Thus, the land acquired over three years ago remained unutilised for want of a specific plan, keeping the investment of Rs 44.30 lakhs idle. This could have been avoided had the differences in perceptions about the

purpose for which the land was being acquired been sorted out before incurring the expenditure.

12.6 Unused facility

National Aeronautical Laboratory (NAL), Bangalore placed (December 1987) an order on a foreign company for supply of a 3 Dimensional CNC Coordinate Measuring Machine with accessories and spares at a total cost of DM 8,61,180 (CIF) plus agency commission of DM 10,000 (Total Rs 68 lakhs approximately). The machine is designed for dimensional metereology analysis. An agreement entered into with the company provided that the equipment was to be shipped, latest by end of June 1988 and installed within 120 days of despatch or 30 days after receipt of the equipment at site. The equipment though received in June 1988 could not be installed as the site was not ready.

The agent had pointed out that the relative humidity requirement for the machine and the computer would not be met by the room air conditioners. Keeping in view this requirement, the Indian agent was informed (September 1988) that the room where the machine was to be fitted was not ready. The civil work and AC Plant room construction were completed in December 1988 when, during the course of installation it was noticed that some parts were damaged during shipment resulting in suspension of installation work. The replacements were received in May 1989 and installation was completed by June 1989. Thereafter, it was seen that the VT-241 colour graphic terminal had not been received. Instead VT 220 was received. The replacement was received in February/March 1990. However, the inspections carried out were not considered as final, since a comprehensive test on the accuracies of the machine had not yet been done. Pending acceptance of the machine finally the agency commission of Rs 0.80 lakhs was withheld. The machine was finally accepted in October 1990.

NAL stated in June 1990 that until the accuracies were established, the machine could not be used (other than for training) to inspect components and log in the data on a permanent basis. It was also stated that Research and Development programmes in respect of different projects were not affected as another 3 axis measuring machine was already in use which though not as fast and sophisticated as the new machine served to obtain, the basic data.

CSIR stated (November 1992) that the machine was procured for augmentation of the facility in the Model shop of NAL to enhance its productivity and the purpose has been achieved.

However, the fact remains that the delay in augmentation of facility resulted in idling of funds of Rs 66.70 lakhs, and denial of the sophisticated facility to NAL for more than two years. Had the required infrastructure been kept ready in time and equipment inspected properly immediately after its receipt,the delay could have been avoided.

(T.N.THAKUR)
Principal Director of Audit
Scientific Departments

New Delhi
The 19 APR 1993

Countersigned

(C.G.SOMIAH)
Comptroller and Auditor
General of India

New Delhi
The 20 APR 1993

APPENDIX I

Statement showing the position of Accounts not submitted to Audit
(Reference - Paragraph No 1.1.4)

S.No.	Name of body	Year upto which accounts submitted to Audit	Year/Years for which accounts not received by Audit
	Department of Atomic Energy		
1.	Tata Institute of Fundamental Research, Bombay	1989-90	1990-91 1991-92
2.	Tata Memorial Centre, Bombay	1990-91	1991-92
3.	Atomic Energy Education Society's School, Bombay	1990-91	1991-92
4.	Saha Institute of Nuclear Physics, Calcutta	1990-91	1991-92
5.	Institute of Physics, Bhubneshwar	1990-91	1991-92
	Department of Space		
6.	Physical Research Laboratory Ahmedabad	1990-91	1991-92
7.	National Remote Sensing Agency Hyderabad	1990-91	1991-92
	Department of Electronics		
8.	Centre for Electronics Design and Technology, Aurangabad	1990-91	1991-92
9.	Centre for Electronics Design and Technology, Srinagar	1986-87	1987-88 1988-89 1989-90 1990-91 1991-92

10.	Society for Applied Microwave Electronics Engineering Research Bombay	1989-90	1990-91 1991-92
11.	National Centre for Software Technology	1990-91	1991-92
	Department of Science and Technology		
12.	S.N.Bose National Centre for Basic Sciences, Calcutta	1990-91	1991-92
13.	Indian Institute of Geomagnetism Bombay	1990-91	1991-92
14.	Bose Institute Calcutta	1990-91	1991-92
15.	Maharashtra Association for Cultivation of Science Pune	1990-91	1991-92
16.	Indian Institute of Astro-physics, Bangalore	1989-90	1990-91 1991-92

APPENDIX II

Outstanding Utilisation Certificates

(Reference - Paragraph No 1.2)

Ministry/Department	Period to which grant relates	Number of utilisation certificates outstanding at the end of March 1992	Amount (Rs in lakhs)
Electronics	1976-77	26	30.73
	1977-78	43	219.66
	1978-79	51	262.20
	1979-80	120	280.69
	1980-81	108	249.30
	1981-82	173	574.48
	1982-83	97	261.46
	1983-84	122	276.49
	1984-85	175	1621.37
	1985-86	106	787.03
	1986-87	181	1182.46
	1987-88	128	7443.02
	1988-89	392	5896.98
	1989-90	367	6242.94
	1990-91	390	6632.93
	Total	2479	31961.74
Environment, Forests and Wildlife	1980-81	28	35.57
	1981-82	90	53.89
	1982-83	120	211.11
	1983-84	256	271.53
	1984-85	280	521.41
	1985-86	318	1062.23
	1986-87	339	3394.97
	1987-88	685	1544.04
	1988-89	745	5198.48
	1989-90	812	946.16
	1990-91	178	304.44
	Total	3851	13543.83
Non Conventional Energy Sources	1983-84	157	220.00
	1984-85	326	691.00
	1985-86	374	759.00
	1986-87	368	1494.00
	1987-88	606	2946.00

	1988-89	710	1514.00
	1989-90	665	1674.00
	1990-91	320	2012.00
	Total	3526	11310.00
Ocean Development	1981-82	4	190.00
	1982-83	3	0.26
	1983-84	32	255.00
	1984-85	38	35.00
	1985-86	48	53.70
	1986-87	66	131.66
	1987-88	49	436.00
	1988-89	105	283.11
	1989-90	183	880.86
	1990-91	68	639.30
	Total	596	2904.89
Space	1976-77	1	0.05
	1977-78	1	0.15
	1978-79	2	0.08
	1979-80	4	0.37
	1980-81	9	1.21
	1981-82	9	6.07
	1982-83	26	8.14
	1983-84	26	15.97
	1984-85	49	17.29
	1985-86	34	10.67
	1986-87	34	11.20
	1987-88	33	15.56
	1988-89	18	20.62
	1989-90	29	38.25
	1990-91	26	50.13
	Total	301	195.76
Science and Technology	1976-77	7	22.00
	1977-78	52	66.00
	1978-79	134	266.00
	1979-80	184	371.00
	1980-81	321	411.00
	1981-82	387	611.00
	1982-83	616	754.00
	1983-84	611	527.00
	1984-85	731	1426.00
	1985-86	994	1748.00
	1986-87	1403	2887.00

	1987-88	2400	3883.00
	1988-89	2178	5475.00
	1989-90	2872	8266.00
	1990-91	3058	107717.00
	Total	15948	134430.00
Geological survey of India (Department of Mines)	1987-88	2	0.15
	1988-89	3	0.15
	1989-90	3	0.19
	1990-91	7	0.42
	1991-92	8	0.80
	Total	23	1.71