Presented to Lok Sabha on..... 10/5/94
Presented to Rajya Sabha on.....

Sale Price Rs. 60/-

REPORT OF THE COMPTROLLER AND AUDITOR GENERAL OF INDIA

FOR THE YEAR ENDED 31 MARCH 1993

NO.6 OF 1994

UNION GOVERNMENT (SCIENTIFIC DEPARTMENTS)

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Preface

This Report for the year ended 31 March 1993 has been prepared for submission to the President under Article 151 of the Constitution.

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 these Departments and some major scientific organisations under some other Departments.

The Report includes audit reviews on the following :

i) Immunological Approaches to Fertility Control
ii) Biogas Development Programme
iii) Utilisation of Foreign Aid
iv) Department of Electronics
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vi) Heavy Water Project, Manuguru
vii) Beryllium Pilot Plant
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ix) Jute Technological Research Laboratories
x) National Geophysical Research Institute
xi) Indian Institute of Chemical Biology

Of the audit reviews, the one on 'Utilisation of Foreign Aid' relates to the Ministries of Environment & Forests and Non-Conventional Energy Sources and the one on 'Biogas Development Programme' is an All-India review incorporating the results of test-audit by Accountants General of sixteen states and three union territories and test-check of the Ministry's records.

The cases mentioned in this Report are those which came to notice in the course of audit during 1992-93 and early part of 1993-94. For the sake of completeness, matters relating to earlier years which could not be covered in the previous Reports are also included. Similarly results of audit of transactions subsequent to 1992-93 have also been mentioned wherever available and relevant.

Overview

R&D funding in India, which is among a few developing countries spending about one *percent* of its GNP on R&D, is largely in the Government sector, with private sector contribution to the national R&D expenditure below 13 *percent* (1990-91). S&T agencies getting major share of the R&D expenditure are Defence Research and Development Organisation (27.5 *percent*), Department of Space (15.5 *percent*), Indian Council of Agricultural Research (13.1 *percent*), Department of Atomic Energy (11.3 *percent*), Council of Scientific and Industrial Research (10.0 *percent*), Ministry of Environment and Forests (8.1 *percent*) and Department of Science and Technology (7.3 *percent*).

Important results of the audit of public moneys spent by the Departments and agencies (except those under the Ministries of Defence and Railways) of the Government of India and the institutions controlled by them which engage predominantly in science and technology, have been given in this Report.

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

Department of Atomic Energy

(i) Heavy Water Project, Manuguru

A two stream heavy water plant **(HWP)** with an integrated captive power plant **(CPP)** at Manuguru, of a total effective capacity of 185 tonnes per year, based on Hydrogen Sulphide water exchange process, was sanctioned in 1982 at an estimated cost of Rs 421.60 crores and with the expected date of commissioning as April 1988. The HWP was commissioned in December 1991 at a total cost of Rs 983.38 crores. The time and cost overruns were attributed to inherent deficiencies in the feasibility report, non-availability of detailed estimates at the first instance, late appointment of consultants and consequent delay in preparation of detailed project reports and delays in completion of CPP and of the mechanical portion of the main plant.

The production of heavy water was 56 *percent* of the target set for 1991-92. The shortfall was due to technical

difficulties in operation of CPP. The cost of production was initially estimated as Rs 5176 per kg. Due to slippages in the project, this was revised in 1986 to Rs 7529 per kg and due to escalation, the final unit cost would have gone up further but the figures relating to the present cost of production were not provided to Audit.

The consultants who were appointed on total management basis had to be paid Rs 2.01 crores as extra remuneration and overstayal compensation of Rs 0.90 crore had to be paid to the contractors. Financial assistance of Rs 2.70 crores provided to a contractor to keep ongoing work progressing did not help in avoiding delay. The firm entrusted with erection and commissioning of external coal handling system, unilaterally resorted to import of ropes at an extra cost of Rs 1.15 crores and completed the work after eight years of its commencement raising the contractual commitment from Rs 6.71 crores to Rs 11.00 crores.

In the absence of full power supply from CPP, the HWP incurred an expenditure of Rs 28.38 crores (including penal charges of Rs 5.69 crores) for power supply from Andhra Pradesh State Electricity Board.

Payment for inferior coal at rates prescribed for the superior quality is causing huge avoidable extra expenditure which worked out to Rs 0.80 crore for three months.

(Para 2.1)

(ii) Beryllium Pilot Plant

Beryllium is a metal used for Space applications and copper-beryllium alloy is used in electronics. The Metallurgy Division of the Bhabha Atomic Research Centre, under the Department of Atomic Energy had initiated, in 1970, a project for a pilot plant to produce beryllium and its alloys. The plant was taken up in March 1978 and became fully operational in November 1982. The utilisation of the installed capacity of the plant since 1982 has been below 6 *percent*. The total expenditure on the plant - capital and operation - till 31 March 1993 was over Rs 7.60 crores.

Solid waste generated in the beryllium plant was to be properly sealed in containers. Construction of the shed was completed in January 1988. The containers though sealed were not grounded in concrete trenches (May 1993).

(Para 2.2)

(iii) Heavy expenditure due to delay in processing tenders

To meet the frequent power cuts and power failures, Nuclear Fuel Complex **(NFC)**, Hyderabad decided in September 1987 to get three 2500 KVA captive power plants which were to be commissioned by February 1989. Due to delay in processing tenders, orders for the plants were placed only in January 1990 and the plants could be commissioned only in May 1993. In the absence of these plants, NFC had to incur an extra expenditure of Rs 4.26 crores (upto March 1993) on hiring of generators.

(Para 2.3)

Department of Biotechnology

(iv) Immunological Approaches to Fertility Control

The Indian Council of Medical Research **(ICMR)** launched in 1983 a major R&D project for development of contraceptive vaccines using immunological approaches. The project to be implemented in six different but complementary parts involved six agencies viz. development of female vaccine **(BhCG)** at National Institute of Immunology **(NII)** - New Delhi, development of male vaccine **(oFSH)** at Indian Institute of Science **(IISc)** - Bangalore, development of female vaccine based on Riboflavin Carrier Protein/Vitamin Carrier Protein **(RCP/VCP)** at IISc - Bangalore and Institute of Research in Reproduction **(IRR)** - Bombay, development of adjuvants at Central Drug Research Institute **(CDRI)** - Lucknow and testing of oFSH on monkeys at National Institute of Health and Family Welfare **(NIHFW)** - New Delhi. In addition, Post Graduate Institute of Medical Education and Research **(PGIMER)** - Chandigarh was to carry out toxicological studies on these vaccines and NII was to research BhCG by recombinant method to enable its mass scale production.

The project was administered by ICMR from 1983-87 and then taken over by the Department of Biotechnology. During the period 1983-92, an expenditure of Rs 12.65 crores had been

incurred and due to delays in achieving the targets, the project had to be extended for another five years at an additional estimated cost of Rs 6 crores.

NII scheduled to complete all three phases of clinical trials of the female vaccine by March 1992 had completed only phase I. IISc scheduled to complete three phases of clinical trials of the male vaccine by March 1992 had taken up phase I and could not analyse data due to non-receipt of results from its field centres. The male vaccine could not be tested at NIHFW because of non-availability of proven fertile female monkeys, mating cages and technologies for monitoring cyclicity of female monkeys. Adjuvants developed by CDRI for use in male and female vaccine had not been used by NII and IISc, resulting in a wasteful investment of Rs 108.77 lakhs. CDRI had also been given an extension for five years though its earlier product had not been used. In the case of RCP, toxicity studies on primates as well as phase I trials on humans was scheduled for completion by March 1992 but IISc had not yet made any conclusive findings based on its tests on primates. In the case of VCP, IRR had not completed trials on non-human primates and phase I trials on humans could therefore not be initiated. Mass scale production of BhCG through recombinant DNA method had not yet begun and this would be possible only after successful completion of the research work which is still going on.

(Para 3.1)

Department of Electronics

(v) Audit review of the Department

Department of Electronics (DOE), set up in 1971, is responsible for policy formulation as well as its implementation and to identify priorities/thrust areas in electronics R&D laboratories and academic institutions. DOE has 19 divisions, three public sector units, 12 autonomous societies, six advisory councils and a number of attached offices. As on 31 March 1993, DOE had 203 scientific/technical personnel and 519 administrative staff.

Following were the findings in an audit review of DOE for the period 1985-93:

- Although Plan allocation of Rs 407 crores in Seventh Plan was made under seven categories, DOE could not make available information relating to projects under the thrust areas. There was a saving of Rs 67.92 crores during 1985-93 due to short release of funds.

- There was no specific strategy/mechanism for R&D funding till March 1992 when DOE streamlined the guidelines for R&D funding in electronics. Even then, the financial control system actually followed was not adequate. Lack of coordination and inadequate planning and monitoring had resulted in lack of follow up of thrust areas under the Plan and non-availability of composite financial data.

- Inadequate and improper exercise of financial control resulted in idle investment in three public sector undertakings. There were delays in repayment of loans amounting to Rs 34.81 crores by 17 parties and in receipt of 2879 utilisation certificates for grants totalling Rs 384.06 crores. Balances of advances of Rs 15.50 crores were outstanding.

- DOE had sanctioned a total of 683 projects till March 1993 of which 475 projects were completed. Of these, a total of 222 projects were completed during 1985-93 in which time overrun in 104 projects ranging from three months to two years and cost overrun in 34 projects by Rs 6.53 crores were noticed.

- Out of the ongoing projects, seven projects with a total value of Rs 5.24 crores were in operation for three to five years beyond their projected dates of completion. Four projects were delayed by more than two to three years whereas funds amounting to Rs 44.34 crores in nine projects did not render productive/fruitful results.

- Assets worth Rs 42.79 crores were lying with different executing agencies but their status was not known to DOE.

- DOE could transfer know-how/technology in respect of only 76 out of 222 projects involving technology development.

- DOE had entered into an agreement with Electronics Trade & Technology Development Corporation Ltd. (ET&T) for procurement of equipment from April 1987. Under this agreement, ET&T had opened letters of credit worth Rs 15.72 crores till March 1992 but corresponding interest accrued (Rs 31.11 lakhs) was not adjusted against the payments made by DOE resulting in loss.

- During 1985-93 shortfall in electronics production and electronics exports in different sectors ranged from 9.6 *percent* to 36.1 *percent* and 17.7 *percent* to 41.1 *percent* respectively of the targets.

- Software technology parks did not show healthy financial or commercial status by which they could become self-sustaining.

- Substantial funds not immediately required by Regional Computer Centre (RCC), Chandigarh and Calcutta and Electronics Research and Development Centre (ER&DC), Trivandrum were released indiscriminately.

(Para 4.1)

Ministry of Mines
(Geological Survey of India)

(vi) Idling of costly sophisticated system

A Digital Field System-V costing Rs 40 lakhs, imported by the Geological Survey of India in 1985, was commissioned in 1988. The equipment was to record and interpret seismic data from blast generated sounds. Since its commissioning, the system could be utilised in three spells for five months only, and since June 1990 the equipment with its sub-systems (procured later at a cost Rs 10 lakhs) has been lying idle in the stores.

(Para 6.1)

Ministry of Non-Conventional Energy Sources

(vii) Biogas Development Programme

Biogas as a cheap and clean dung based fuel is being promoted through (i) construction of family type biogas plants (FBP) under the National Project for Biogas Development (NPBD), (ii) Community/Institutional Biogas

Plants (CBP/IBP) and (iii) Research and Development (R&D). NPBD was started in November 1981 and CBP/IBP in 1982-83.

These programmes are implemented through State nodal departments/agencies, Khadi and Village Industries Commission (KVIC) and National Dairy Development Board (NDDB). Ministry of Non-Conventional Energy Sources (MNES) released Rs 502.47 crores as subsidy during 1985-93 for implementation of the programme (through the implementing agencies).

Out of 33 states, union territories (UTs) and other agencies, there was shortfall in achievement of targets in fourteen. Cases of misreporting of achievement to the tune of 28978 plants was noticed in six states out of which Tamil Nadu alone accounted for 80 *percent* cases, and 16802 defective plants were noticed in six states of which Tamil Nadu and Maharashtra accounted for the majority. Prescribed percentage of physical verification was not followed in 16 states and three UTs. Instructions regarding ear-marking of subsidy for setting up of biogas plants for SC/ST beneficiaries were not followed in five states.

Subsidy of Rs 5.56 crores was paid in advance in Andhra Pradesh and Orissa, at higher rates by Rs 1.37 crores in Assam, Haryana and Punjab and irregular/inadmissible subsidy amounting to Rs 0.59 crore was paid in four states. Cases of plants costing Rs 1.53 crores not functioning due to non-availability of dung and water were noticed in Andhra Pradesh, Maharashtra and Orissa. Cases of non-completion of plants costing Rs 14.16 crores were noticed in Andhra Pradesh, Delhi, Orissa, Punjab and Rajasthan.

Adjustment accounts for Rs 1.37 crores were not submitted to MNES by Bihar and Rajasthan and utilisation certificates for Rs 53.62 crores were not submitted by Bihar, Himachal Pradesh, Uttar Pradesh and West Bengal. Rs 6.41 crores were diverted for expenditure on items other than biogas programme in six states. Unspent balances amounting to Rs 13.96 crores remained with twelve states of which Bihar and Uttar Pradesh accounted for 75 *percent* of the unspent balances. Targets for various training courses were not achieved in seven states.

Monitoring of the programme by the States and MNES was inadequate. An evaluation survey was conducted by the

National Council of Applied Economic Research for the Seventh Five Year Plan period. The evaluation survey indicated that some households had no cattle, seventy five *percent* of biogas plants were oversized - compared to input availability or output requirement - obviously geared to higher subsidy amount, and sixty *percent* of those for SC/ST were defunct or never commissioned. The staff employed by the implementing agencies were largely non-technical and there was very little follow up after installation.

(Para 7.1)

National Informatics Centre

(viii) Materials Management

National Informatics Centre (NIC) was set up in 1977 as an apex body, under the Department of Electronics, to provide informatics services to various Ministries and Departments. 'Informatics' includes setting up of information/computer centres, conducting feasibility studies, design and development of management information systems including complete hardware/software support. In March 1988, NIC was transferred from the Department of Electronics to the Planning Commission.

NIC had incurred an expenditure of Rs 152.28 crores on procurement of stores during 1986-93 out of which 1051 purchase cases valuing Rs 82.62 crores were seen in audit.

Physical verification of stores at NIC headquarters and seven State/Regional Informatics Centres was not carried out regularly. The discrepancies between stores issued from NIC and those accounted for by the State Informatics Centres were not reconciled. Besides there was no system for methodical recording, monitoring and consolidating expenditure on procurement of consumable and non-consumable stores.

NIC arranged leasing of a transponder on the satellite Intelsat through Department of Telecommunications for data transmission under NICNET programme. Though NICNET switched over its operation from satellite Intelsat to Insat-1D, NIC made an excess payment of Rs 49.61 lakhs due to delay in taking a decision for surrendering the Intelsat link.

For the procurement of distribution rights of a software 'Z' NIC invested an amount of Rs 1.07 crores. The cost was to be shared amongst six prime users of the software and NIC was also expected to generate revenue of Rs 1.62 crores through consultancy, maintenance and sale of copies of the software. NIC could realise only Rs 98.79 lakhs on account of usage of the software, including Rs 40.80 lakhs recovered as share of one of the prime users towards the initial cost of copyright.

Due to improper planning and monitoring, equipment worth Rs 3.67 crores remained uninstalled for periods upto 39 months. Besides stores worth Rs 1.15 crores were also lying without use for long periods.

Penalty for delay in supply of stores was waived resulting in loss of Rs 11.13 lakhs in two cases noticed by Audit.

In four cases, customs duty amounting to Rs 52.13 lakhs had been overpaid, claims for refunds of which had either not been lodged or were still pending.

(Para 8.1)

Department of Science and Technology

(ix) Irregular purchase of vehicle

In the Survey of India a staff car was purchased at a total cost of Rs 1.93 lakhs without sanction and without provision of funds. It was bought unauthorisedly by irregularly appropriating a part of the advance from a sponsor for a sponsored project and it was also not used for that project.

(Para 9.1)

(x) Budget management

In the Department of Science and Technology, heavy re-appropriations between heads and sub-heads have become a recurring phenomenon as the Department failed to make realistic assessment of requirements of funds. It was also seen that even after re-appropriation of funds, there were excess/savings under various sub-heads. The Department surrendered savings ranging from 14 to 100 *percent* in the last week of March every year. Surrenders under capital

heads were of the order of 30.7 and 37.6 *percent* in 1990-91 and 1992-93 respectively.

(Para 9.2)

Department of Space

(xi) Physical Research Laboratory

Physical Research Laboratory (PRL) was founded by the late Dr. Vikram A. Sarabhai in November 1947 for research in space science.

Out of 50 in-house programmes, only 14 programmes were completed and four programmes were going on for more than 10 years.

Out of 13 sponsored projects, only eight were completed. There was cost overrun upto Rs 0.62 crore and time overrun upto 50 months on these completed projects.

An infra red telescope which was to be set up at Mount Abu at a cost of Rs 0.50 crore could not be commissioned even after 16 years and spending Rs 3.67 crores.

A project: 'Appropriate automation promotion programme' entrusted by the Department of Electronics in 1984 for automation of textile industry could not be completed even after nine years and spending Rs 2 crores. Interestingly, this project was not within the purview of PRL, as the main objective of PRL was to conduct research in space science.

Out of three inter-planetary space stations set up at a cost of Rs 40.11 lakhs at Thaltej (Ahmedabad), Surat and Rajkot, one (Surat station) was closed in April 1992 and performance of the other two stations was not satisfactory due to FM band radio disturbance.

The technique developed under the project: 'Faint object astronomy with charged coupled devices (CCD) camera' at a cost of Rs. 23.63 lakhs could not be transferred to the industry to develop CCD camera technology within the country.

(Para 10.1)

(xii) Excess procurement of stores

The Vikram Sarabhai Space Centre (VSSC), Trivandrum procured 160.4 tonnes of blooms in different sizes, costing over a crore of rupees during 1989-93 for the pre-project activity of Geosynchronous launch vehicle (GSLV). These stores were lying unutilised for periods ranging from six to sixty months.

In another case, VSSC procured refrasil cloth usable in thermal protection and insulation for rocket nozzles, without proper planning. As a result, 8230 metres of the cloth imported in January 1989 at a cost of Rs 29.39 lakhs and 7470 sq metres procured indigenously in 1991 costing Rs 42.95 lakhs remained unutilised.

(Paras 10.3 and 10.2)

Indian Council of Agricultural Research

(xiii) Jute Technological Research Laboratories

Jute Technological Research Laboratories (JTRL) established in 1939 to undertake technological research on jute and other long vegetable fibres incurred an expenditure of Rs 737.57 lakhs during 1988-93. Of the total income of Rs 854.35 lakhs during that period, the grant from the Indian Council of Agricultural Research (ICAR) constituted Rs 848.77 lakhs and other receipts only Rs 5.58 lakhs.

The management committee did not sit regularly as provided for in bye laws of ICAR and attendance of outside experts was poor in these meetings.

Mechanism of manpower utilisation was not sound. Number of projects taken up were low as compared to the scientific manpower available.

Mechanism for monitoring and evaluation of results of research in JTRL was poor. The Staff Research Council did not meet regularly and minutes of meetings were not recorded properly.

Research identification and planning was done as an in-house exercise with which public and private sector bodies having interest in jute technology were not associated. As a result, the research results could not find their way to the

industries. Quinquennial Review Team had recommended constitution of Research Advisory Council with experts from industry and other research institutions for formulation of research policies and identification of research projects. The recommendation was not implemented.

No patent had been filed since 1977 and no technology was developed during 1988-93.

Out of 29 technologies developed by JTRL since inception, only eight could be transferred to private parties and entrepreneurs and that too, through informal interactions of published literature.

A sponsored project was taken up long after receipt of funds. Records about sponsored projects were not made available to Audit.

Cases of equipments purchased for sponsored projects long after the projects were completed, equipments purchased but installed long after procurement due to faulty planning, equipment procured with different specification from that mentioned in the tender enquiry resulting in unintended benefit to the supplier and extra installation charges paid though the purchase order provided for free installation were noticed in audit.

(Para 11.1)

Council of Scientific and Industrial Research

(xiv) Indian Institute of Chemical Biology

Indian Institute of Chemical Biology (IICB) established in 1956 to undertake research in basic biological science for seeking solutions to medical problems incurred an expenditure of Rs 30.29 crores during the period 1987-93. Grants from Council of Scientific and Industrial Research (CSIR) amounted to Rs 30.32 crores and internal revenue earned was Rs 2.16 crores falling far short of the target of 30-40 *percent*.

Evaluation and monitoring at central level was inadequate. Progress reports were not submitted and no internal monitoring committee had been formed.

None of the in-house projects were completed during 1985-93. Projects were renamed and regrouped in 1990-91 even after their continuation for periods ranging from five to eleven years. Progress of research had not been evaluated to ascertain extent of achievement of objectives.

A research programme of the project: 'Fertility management' started in 1984 required revision to achieve the target after an expenditure of Rs 1.96 crores.

No know-how was developed and 21 patents though filed were not processed.

(Para 12.1)

(xv) National Geophysical Research Institute

National Geophysical Research Institute **(NGRI)**, Hyderabad established in October 1961 to undertake research in methodology for geophysical exploration of oil, minerals and ground water, incurred an expenditure of Rs 35.63 crores during 1988-93. This amount was received as grants from the Council of Scientific and Industrial Research. NGRI was required to generate resources upto 33.3 *percent* of its revenue expenditure. However, by 1992-93 it could generate only 14 *percent*.

Out of thirty in-house projects completed during 1988-93, there was delay upto three years in twenty projects. In 10 projects final report had not yet been submitted and four projects were short closed. Short closure of the projects were due to non-availability of external funding, research results not having been numerically computed and poor progress. Amount spent on these projects was Rs 169.30 lakhs.

Technology mission project on drinking water could not progress even after an expenditure of Rs 87.64 lakhs.

Adoption of incorrect rates of overhead charges from ONGC resulted in undercharging by Rs 41.73 lakhs to NGRI.

Despite the establishment of a project monitoring cell, periodical progress and completion reports of in-house projects were not available with it.

(Para 12.2)

(xvi) Equipments lying idle

During test-check of records of laboratories/institutes of the Council of Scientific and Industrial Research it was seen that equipments worth Rs 29.67 lakhs were either not installed or not used for periods ranging from nine months to over six years with the result that the purpose for which these were procured, was not served.

(Para 12.3)

(xvii) Excess expenditure for unconsumed power

The National Metallurgical Laboratory, Jamshedpur had been making payment for power to a company according to an 'agreement maximum demand' which was much in excess of the actual requirement. As a result, excess expenditure of Rs 56.16 lakhs had to be incurred for unconsumed power.

(Para 12.4)

Utilisation of Foreign Aid

(xviii) Audit review of projects in the Ministry of Environment and Forests and the Ministry of Non-Conventional Energy Sources

Utilisation of foreign aid in 10 projects, five each in the Ministry of Environment and Forests (**MEF**) and in the Ministry of Non-Conventional Energy Sources (**MNES**), were examined in audit. Total outlay of the 10 projects was Rs 824.04 crores and the extent of utilisation ranged from 0.81 *percent* to 100 *percent*. In two projects, utilisation was less than 50 *percent* and figures for utilisation were not available for another two projects. Total revision of time span with reference to the original targets varied from five to sixty months in the ten projects.

In four cases, objectives had not yet been achieved, in one case they had not been fully achieved, in two cases they had not been achieved at all and in three cases information was not available in the Ministries concerned. In case of three projects, the details regarding receipt of aid were not available with the accounting authority viz. the Controller of Aid Accounts and Audit (**CAA&A**).

Under 'National social forestry project' aided by World Bank and United States Agency for International Development

(USAID), cases of wrong classification resulting in non-reimbursement (Himachal Pradesh), excess purchase of polythene granules and non-transfer of plantation areas to gram panchayats (Rajasthan), violation of orders resulting in loss of revenue, violation of the World Bank norms resulting in non-reimbursement and excess procurement of vehicles (Uttar Pradesh) were noticed in audit. World Bank's own assessment of project weaknesses in Uttar Pradesh indicated lack of marketing information system, problems in supply of seedlings, ineffective monitoring and analysis of project research and its use in project management decisions.

Under the Ganga Action Plan projects, there were delays in completion of works in the 'Integrated sanitation works in Kanpur and Mirzapur'. Effective performance of the upflow anaerobic sludge blanket system, in the absence of full adoption of chromium recovery technology, was questionable. Further, the technology for post-treatment of effluents from upflow anaerobic sludge blanket system was still in an experimental stage in Netherlands and therefore could not be adopted in India. Non-installation of equipments, training details not being available, delays in planning, detailed review not having been conducted were some of the problems that afflicted the 'Technical assistance and equipments' project aided by the United Kingdom.

Aid provided by Government of Sweden for 'Strengthening of Indian Institute of Forest Management, Bhopal' could not be utilised substantively because of management problems, infighting in the faculty, problems in design of management development programmes etc.

Under the 'Strengthening of Central and State Pollution Control Board laboratories' project, equipment had not been utilised, training contracts had not been met, consultancy provision had not been fully utilised and there had been endemic delays.

Under the 'Development of amorphous silicon solar cells' project, there were problems in commissioning of equipment, non-transfer of technology to pilot plant and inadequate production of solar cells. Under the 'R&D studies on woody bio-mass species for arid marginal lands' project funded by USAID, there was no information on status of the project and completion and achievement of objectives.

Under the 'Windmill farms project' aided by Danish International Development Agency **(DANIDA)**, there were defects in operation of equipment resulting in lower achievement. The project had not been approved by the Planning Commission.

Under the 'Non-Conventional energy pilot project - 10 solar thermal ice pack freezers and 3 solar thermal milk chilling plants' project, equipment installed remained idle due to technical faults. The project was closed in 1992 because the technology was not proven viable in the Indian conditions.

(Para 13.1)

List of acronyms

AAPC	:	Appropriate Automation Promotion Centres
AAPP	:	Appropriate Automation Promotion Programme
ACTREC	:	Advanced Centre for Training, Research and Education
AEC	:	Atomic Energy Commission
AIR	:	All India Radio
AMD	:	Atomic Minerals Division
APSEB	:	Andhra Pradesh State Electricity Board
ASLV	:	Augumented Satellite Launch Vehicle
ATIRA	:	Ahmedabad Textile Industries Research Association
ATNs	:	Action Taken Notes
BARC	:	Bhabha Atomic Research Centre
Be	:	Beryllium
BEL	:	Bharat Electronics Limited
BhCG	:	Beta human Chorionic Gonadotrophin
BHEL	:	Bharat Heavy Electrical Ltd
BTRA	:	Bombay Textiles Research Association
C-DAC	:	Centre for Development of Advanced Computing
C-DOT	:	Centre for Development of Telematics
C-MET	:	Centre for Materials for Electronics Technology
CAA&A	:	Controller of Aid Accounts and Audit
CASE	:	Centre for Advanced Study on Electronics; Commission for Additional Sources of Energy
CAT	:	Centre for Advanced Technology
CBI	:	Central Bureau of Investigation
CBP	:	Community Biogas Plant
CCD	:	Charged Coupled Devices
CCTV	:	Closed Circuit Television
CDEC	:	Customs Duty Exemption Certificate
CDRI	:	Central Drug Research Institute
CEDT	:	Centre for Electronics Design and Technology
CEERI	:	Central Electronics Engineering Research Institute
CEL	:	Central Electronics Ltd
CIF	:	Cost Insurance and Freight
CIFT	:	Central Institute of Fisheries Technology
CMC	:	Computer Maintenance Corporation
CMCS	:	Central Monitoring and Control System
CMERI	:	Central Mechanical Engineering Research Institute
CMPDI	:	Central Mine Planning and Design Institute

CO_2	:	Carbon dioxide
CPCB	:	Central Pollution Control Board
CPM	:	Critical Path Method
CPP	:	Captive Power Plant
CPWD	:	Central Public Works Department
CRCP	:	Chicken Riboflavin Carrier Protein
CRIS	:	Centre for Railway Information System
CSIR	:	Council of Scientific and Industrial Research
Cu	:	Copper
Cu m	:	Cubic metre
CWCP	:	Central Water Chiller Plant
DC	:	District of Columbia
DAE	:	Department of Atomic Energy
DANIDA	:	Danish International Development Agency
DARE	:	Department of Agricultural Research and Education
DBT	:	Department of Biotechnology
DCEI	:	Development Council for Electronics Industry
DEA	:	Department of Economic Affairs
DEDA	:	Delhi Energy Development Agency
Dfl	:	Dutch florijnen (currency of Netherlands)
DGEI	:	Development Council for Electronics Industry
DGS&D	:	Directorate General of Supplies and Disposals
DGTD	:	Directorate General of Technical Development
DKR	:	Danish Kroner
DM	:	Deutsche Mark
DMRL	:	Defence Metallurgical Research Laboratory
DNA	:	Deoxyribonucleic acid
DNES	:	Department of Non-Conventional Energy Sources
DOD	:	Department of Ocean Development
DOE	:	Department of Electronics
DOEN	:	Department of Environment, Forests and Wildlife
DOS	:	Department of Space
DOT	:	Department of Telecommunications
DPS	:	Directorate of Purchase and Stores
DRDAs	:	District Rural Development Agencies
DSIR	:	Department of Scientific and Industrial Research
DST	:	Department of Science & Technology
EC	:	Electronics Commission
ECIL	:	Electronics Corporation of India Limited
EDP	:	Electronic Data Processing
EFC	:	Expenditure Finance Committee
EIL	:	Engineers India Ltd
EM	:	Expert-Months

EMDC	:	Electronics Material Development Council
EPABX	:	Electronic Private Auxiliary Branch Exchange
ER&DC	:	Electronics Research & Development Centre
ER&DL	:	Explosives Research & Development Laboratory
ERTL	:	Electronics Regional Test Laboratory
ET&T	:	Electronics Trade & Technology Development Corporation Ltd.
ETDC	:	Electronics Test and Development Centres
FBP	:	Family type Biogas Plants
FBTR	:	Fast Breeder Test Reactor
FOB	:	Free on Board
FORV	:	Fishery and Oceanographic Research Vessel
GAP	:	Ganga Action Plan
GEB	:	Gujarat Electricity Board
GEDA	:	Gujarat Energy Development Agency
GFRs	:	General Financial Rules
GIA	:	Grants-in-aid
GNP	:	Gross National Product
GPD	:	Ganga Project Directorate
GSI	:	Geological Survey of India
GSLV	:	Geosynchronous Launch Vehicle
GTOs	:	Gate Turn Of
GTZ	:	German Technical Cooperation Agency
hCG	:	An anti-fertility vaccine for female
HCL	:	Hindustan Computers Limited
HRA	:	House Rent Allowance
HTPB	:	Hydroxyl Terminated Poly Butadiene
HWP	:	Heavy Water Plant
IACS	:	Indian Association for Cultivation of Science
IAFC	:	Immunological Approaches to Fertility Control
IAT	:	Infra red Astronomy Telescope
IBP	:	Institutional Biogas Plant
ICAR	:	Indian Council of Agricultural Research
ICMR	:	Indian Council of Medical Research
ICP	:	Inductivity Coupled Spectrophotometer
IGCAR	:	Indira Gandhi Centre for Atomic Research
IIA	:	Indian Institute of Astrophysics
IICB	:	Indian Institute of Chemical Biology
IIFM	:	Indian Institute of Forest Management
IISc	:	Indian Institute of Science
IMSC	:	Inter-ministerial Standing Committee
IP	:	Inter-planetary
IPS	:	Inter-planetary space; Inter-planetary scintillation
IRR	:	Institute for Research in Reproduction
IRT	:	Infra red telescope

ISRO	:	Indian Space Research Organisation
ISY	:	International Space Year
ITI	:	Industrial Training Institute
ITRC	:	Industrial Toxicology Research Centre
JTRL	:	Jute Technological Research Laboratories
KAPP	:	Kakrapar Atomic Power Project
Kg	:	Kilogram
KV	:	Kilo Volt
KVA	:	Kilo Volt Amperes
KVIC	:	Khadi and Village Industries Commission
KW	:	Kilo Watt
KWH	:	Kilo Watt Hour
LC	:	Letter of Credit
MAPS	:	Madras Atomic Power Station
MARSIS	:	Marine Satellite Information Service
MC	:	Management Council
MDP	:	Management Development Programmes
MEF	:	Ministry of Environment and Forests
MKU/BU	:	Madurai Kamaraj University/Bharathidhasan University
MNES	:	Ministry of Non-Conventional Energy Sources
MOU	:	Memorandum of Understanding
MSEB	:	Maharastra State Electricity Board
MVA	:	Million Volt Ampere
MW	:	Mega Watt
NA	:	Not Available
NBP	:	Nightsoil Biogas Plants
NBRI	:	National Botanical Research Institute
NCAER	:	National Council of Applied Economic Research
NCMRWF	:	National Centre for Medium Range Weather Forecasting
NCST	:	National Centre for Software development and computing Technology
NDDB	:	National Dairy Development Board
NFC	:	Nuclear Fuel Complex
NGRI	:	National Geophysical Research Institute
NIC	:	National Informatics Centre
NICNET	:	National Informatics Centre Network
NIHFW	:	National Institute of Health and Family Welfare
NII	:	National Institute of Immunology
NMC	:	National Microelectronics Council
NMIC	:	Not Manufactured in India Certificate
NML	:	National Metallurgical Laboratory
NMR	:	Nuclear Magnetic Resonance
NOAA	:	National Oceanic Atmospheric Administration

NOIDA	:	New Okhla Industrial Development Authority
NPB	:	Nuclear Power Board
NPBD	:	National Project for Biogas Development
NRC	:	National Radar Council
NRIC	:	Non-repairable in India Certificate
NSFP	:	National Social Forestry Project
NZP	:	National Zoological Park
oFSH	:	ovine Follicle Stimulating Hormone
ONGC	:	Oil and Natural Gas Commission (now Corporation)
ORV	:	Oceanography Research Vessel
PAC	:	Proprietary article certificate
PAO	:	Pay and Accounts Officer
PC/AT	:	Personnel Computer/Advance Technology
PEO	:	Panchayat Extension Officer
PERT	:	Project Evaluation and Review Technique
PGDFM	:	Post Graduate Diploma in Forest Management
PGIMER	:	Post Graduate Institute of Medical Education and Research
PHWR	:	Pressurised Heavy Water Reactor
PI	:	Principal Investigator
PMB	:	Project Management Board
PME	:	Project Monitoring and Evaluation
PO	:	Purchase Order
PRL	:	Physical Research Laboratory
PRSG	:	Project Review and Steering Group
PSE	:	Planning and System Engineering
PSLV	:	Polar Satellite Launch Vehicle
PSU	:	Public Sector Undertaking
QRT	:	Quinquennial Review Team
Qty	:	Quantity
R&D	:	Research and Development
RAC	:	Research Advisory Council/Committee
RBI	:	Reserve Bank of India
RC	:	Research Council
RCC	:	Regional Computer Centre
RCP	:	Riboflavin Carrier Protein
RCS	:	Reactor Control System
S&T	:	Science and Technology
SAC	:	Scientific Advisory Committee
SAFISY	:	Space Agency Forum of International Space Year
SAIL	:	Steel Authority of India Limited
SAMEER	:	Society for Applied Microwave Electronics Engineering Research
SC/ST	:	Scheduled Castes/Scheduled Tribes

SCL	:	Semi-conductor Complex Ltd
SDR	:	Special Drawing Rights
SEC	:	Solar Energy Centre
SECO	:	System Engineering and Consultancy
SEK	:	Swedish Kroner
SERC	:	Structural Engineering Research Centre
SIC	:	State Informatics Centre
SIDA	:	Swedish International Development Agency
SOI	:	Survey of India
SRC	:	Safety Review Committee
STP	:	Software Technology Park
STPI	:	Software Technology Parks of India
STQC	:	Standardisation Testing and Quality Control
T&B	:	Telecommunications and Broadcasting
TDC	:	Technology Development Council
TEC	:	Technical Evaluation Committee
TIFR	:	Tata Institute of Fundamental Research
TNEB	:	Tamil Nadu Electricity Board
TT	:	Tetanus toxoid
TWI	:	Thames Water International
UASB	:	Upflow Anaerobic Sludge Blanket
UNIDO	:	United Nations Industrial Development Organisation
UNDP	:	United Nations Development Programme
UP	:	Uttar Pradesh
UPS	:	Uninterrupted power supply system
US	:	United States
USAID	:	United States Agency for International Development
UTs	:	Union Territories
VCP	:	Vitamin Carrier Protein
VHP	:	Vacuum hot pressed
VLSI	:	Very Large Scale Integration
VSSC	:	Vikram Sarabhai Space Centre
WRC	:	Western Regional Centre

CHAPTER I

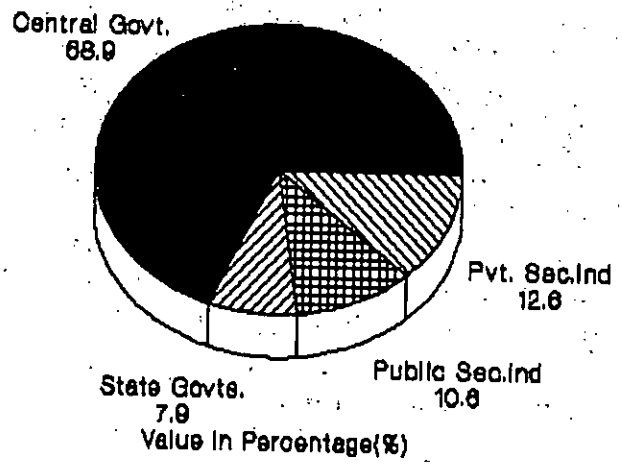
1.1 Introduction

1.1.1 To a great extent the developed countries of the world still retain monopoly over the process of development in Science and Technology (S&T), but the developing world is also gradually increasing its Research and Development (R&D) expenditure to reap the advantages of S&T. Of the total expenditure on R&D: US $ 452.6 billion in 1990, the share of developing countries was US $ 18.3 billion (4 *percent*). R&D expenditure as percentage of GNP, in 1990, was 2.55 for the world as a whole while that for the developing countries was 0.64 and for the developed countries 2.92. India is among a few countries spending about one *percent* of its GNP on R&D.

1.1.2 The 'Scientific Policy Resolution, 1958' and the 'Technology Policy, 1983' outline the approach of the Government of India towards attainment of the goal of scientific and technological development and self-reliance. In keeping with the policies, allocation for S&T has been increasing, reaching the level of Rs 8313 crores in the Seventh Plan period from Rs 20 crores in the First Plan, and a significant S&T infrastructure has been created covering a very broad spectrum of disciplines. With the economic reforms and industrial liberalization introduced by the Government of India, a new Technology Policy statement is now on the anvil.

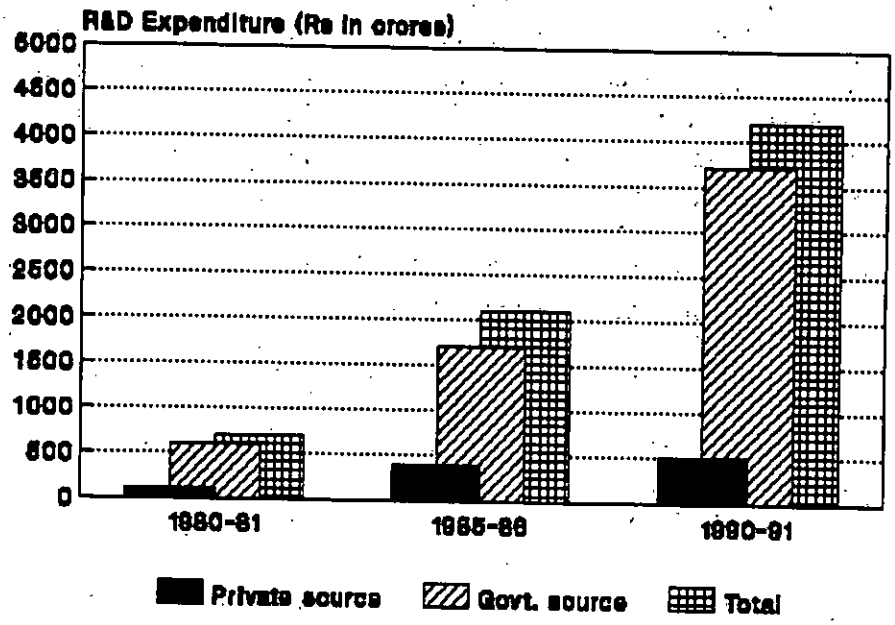
1.1.3 R&D funding in India is largely in the Government sector as is clear from the graphs below:

National R&D Expenditure By Sector, 1990-91



Total=Rs 4188.43 crores

National R&D Expenditure By Sources Of Funds



1.1.4 There are a number of departments, commissions and councils in the Government of India concerned with Science & Technology. Notable among these agencies are:

- Department of Agricultural Research and Education and the Indian Council of Agricultural Research
- Department of Atomic Energy and Atomic Energy Commission
- Department of Biotechnology
- Ministry of Environment and Forests
- Department of Electronics
- Indian Council of Medical Research
- Ministry of Non-Conventional Energy Sources
- Department of Ocean Development
- Department of Space and Space Commission
- Department of Science and Technology
- Department of Scientific and Industrial Research and the Council of Scientific and Industrial Research

In addition to the above, the Ministry of Defence has its own R&D organisation.

The Department of Science and Technology functions as the nodal agency for implementing and coordinating activities of multi-disciplinary nature.

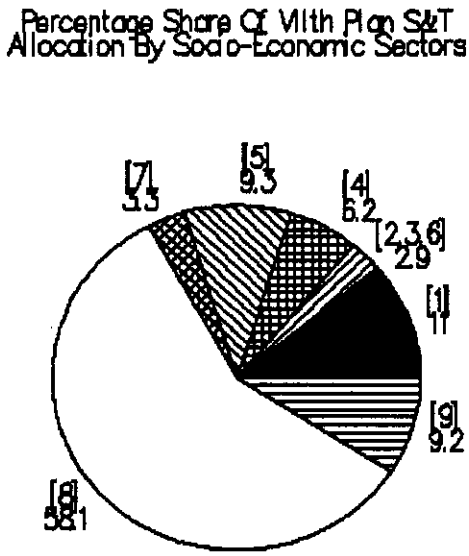
1.1.5 The scientific agency-wise share of S&T allocation (Plan & non-Plan) during the Seventh Five Year Plan was as follows:

Agency	**Percentage of allocation**
Department of Atomic Energy (DAE)	11.5
Council of Scientific and Industrial Research (CSIR)	11.3
Department of Scientific and Industrial Research	0.3
Department of Space (DOS)	20.7
Department of Science and Technology (DST)	10.0
Department of Environment, Forests and Wildlife (DOEn)	N A
Department of Ocean Development (DOD)	1.4
Department of Biotechnology (DBT)	1.8

Indian Council of Agricultural Research (ICAR)	10.2
Indian Council of Medical Research (ICMR)	2.6
Department of Non-Conventional Energy Sources (DNES)	2.0
Department of Electronics (DOE)	0.8
Share of all agencies in total Central government S&T allocation	72.6

N A: Not available

1.1.6 Percentage share of Seventh Plan S&T allocation by socio-economic sectors was as follows:



1. Agriculture
2. Rural Development
3. Irrigation & Flood Control
4. Energy
5. Industry & Minerals
6. Transport
7. Communication, Information & Broadcasting
8. Science & Technology
9. Social Services

1.1.7 Considering that the S&T agencies need a flexible and liberal approach in regard to rules, procedures, etc.

because of their very nature and also the fact that they have to achieve results at a fast pace, the Scientific Advisory Committee to the Cabinet had recommended enhanced delegations of administrative and financial powers to these departments/organisations. As a result of their recommendations, two orders were issued (in December 1983 and May 1986) enhancing administrative and financial powers of the S&T departments/organisations and they now enjoy greater authority and autonomy than the other Government departments/organisations. Naturally, the following issues need consideration in this context:

- To what extent have the enhanced administrative and financial powers been made use of in achieving the targets/goals/objectives by the scientific departments/organisations?

- Whether the flexible complementing policy of promotion of scientists has been implemented properly and made use of effectively in sustaining the motivation of scientific manpower?

- Whether the procedure of recruitment of scientists directly by scientific departments/organisations, outside the Union Public Service Commission procedure, has reduced the delays and achieved any other significant benefits?

- Whether exemption from the purchase through the Central Purchase Organisation of the Government of India has yielded specific benefits?

- Whether exemption from the Central Public Works Department and enhanced powers for undertaking construction directly are being fully made use of and whether the intended results are being achieved?

- **Greater autonomy means greater accountability.** As a result of wider delegation of powers providing for greater autonomy, has there been any corresponding increase in the accountability of these departments/organisations?

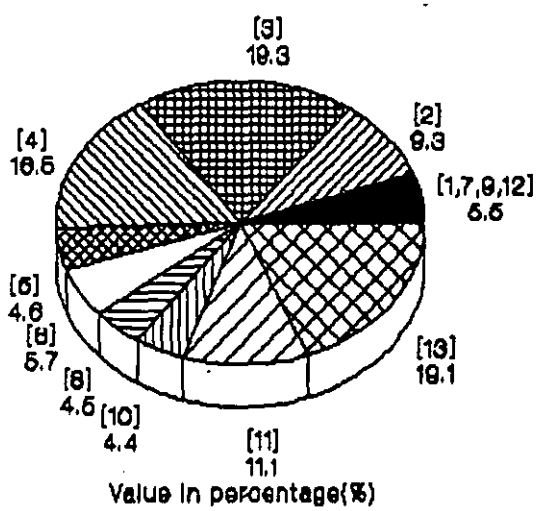
With the problems of the resources crunch and looking at the economy as a whole, scientific departments/organisations have to **find ways of making S&T/R&D self-sustaining;** since

the gestation period of most S&T projects are over, the spin-offs from these should produce funds for plow-back into the new projects. Here, S&T/R&D has to be lo ked at with reference to the social and industrial benefits and costs.

1.1.8 R&D activities

National investment on R&D activities has increased from Rs 22.93 crores in 1958-59 (0.17 *percent* of GNP) to Rs 4186.43 crores in 1990-91 (0.89 *percent* of GNP). Expenditure on R&D and related S&T activities was estimated at Rs 5323 crores in 1991-92. Central Government institutions accounted for 68.9 *percent* of national R&D expenditure. Share of national R&D expenditure by different objectives was as follows:

National R&D Expenditure By Objectives, 1990-91



1. Exploration and assessment of the biosphere
2. Space
3. Development of agriculture, forestry and fishing
4. Promotion of industrial development
5. Production, conservation and distribution of energy
6. Development of transport and communication
7. Development of education services
8. Development of health services

9. Social development and socio-economic services
10. Protection of the environment
11. General advancement of knowledge
12. Other aims
13. Defence

The share of R&D expenditure among the scientific agencies was as follows:

R&D expenditure by major scientific agencies (1990-91)

Agency	**Percentage**
Defence Research and Development Organisation **(DRDO)**	27.5
Department of Space **(DOS)**	15.5
Indian Council of Agricultural Research **(ICAR)**	13.1
Department of Atomic Energy **(DAE)**	11.3
Department of Science & Technology **(DST)**	7.3
Council of Scientific and Industrial Research **(CSIR)**	10.0
Department of Environment, Forests and Wildlife **(DOEn)**	8.1
Department of Biotechnology **(DBT)**	1.9
Indian Council of Medical Research **(ICMR)**	1.7
Department of Non-Conventional Energy Sources **(DNES)**	1.3
Department of Ocean Development **(DOD)**	1.3
Department of Electronics **(DOE)**	1.0
	100.0

Enquiries with some of the above agencies revealed that the R&D efforts were dependent on continuing government budgetary support and were hardly met from internally generated incomes/finances.

Most of the research funded by the Ministry of Environment and Forests related to study of various ecosystems and generating knowledge for proper resource management; these seldom led to saleable commercial patents. ICAR was yet to introduce a scheme or plan to make the R&D programme independent of government funding. CSIR has, however, started since 1980-81 to supplement the government support by generating extra budgetary resources (EBR) through sponsored and consultancy projects as well as transfer of

celebration of ISY in the organisation of a workshop 'Space technology in developing countries - making it happen', during the World Space Congress held in Washington DC in August-September 1992.

- Indigenously built second generation multipurpose satellite, INSAT-2A was launched aboard the European Launch Vehicle, Ariane. The satellite, which was pressed into service within a month of its launching, is providing regional TV distribution services since August 1992. The satellite is also providing communications and meteorological services.

- In May 1992, the indigenously developed launch vehicle, ASLV-D3 was successfully launched. It successfully placed the 106 kg SROSS-C satellite into earth's orbit. An important feature of the launch was that ASLV-D3 used indigenously developed Hydroxyl Terminated Poly Butadiene (HTPB) based propellants for its strap-on, first and second stages. Apart from this, the successful launch of ASLV-D3 has validated a number of technologies crucial for PSLV and GSLV programmes being pursued.

- Unit-I of the Kakrapar Atomic Power Project (KAPP) attained criticality and was synchronized with the western grid.

- Unit-II of the Narora Atomic Power Station commenced commercial operation.

- Research reactors Dhurva, Cyrus and Apsara were being operated at BARC and provided facilities for neutron beam research, neutron radiography and isotope production.

- Thorium bundles were successfully used for the first time in a pressurised heavy water reactor (PHWR) core of KAPP-I to achieve an efficient power flattering based on solvent extraction process developed at BARC.

- Thrust was given to the development of bio-sensors specifically for pollution monitoring. ELISA techniques and DNA probes have been developed for detection of virus, bacteria and *E. histolytica* in drinking water. A two stage process for microbial desulphurization of

gaseous fuels containing high concentration of hydrogen sulphide, with sulphur recovery using ferric sulphate as an oxidant, has been developed.

- The multi-disciplinary research cruises of Oceanography Research Vessel **(ORV)**: Sagar Kanya and thirteen cruises of Fishery and Oceanographic Research Vessel **(FORV)**: Sagar Sampada were completed and performance of deep sea trawlers designed and developed at the Central Institute of Fisheries Technology **(CIFT)** was demonstrated.

- Marine Satellite Information Service **(MARSIS)** Centres disseminated potential fishery zone information to fishermen through their cooperative societies.

1.1.11 Coverage under the Report

The comparative position of amounts spent by the major scientific departments/organisations, covered under this Report, during the year 1992-93 and in the preceding two years is given below:

S. No.	Ministry/Department/ Organisation	1990-91	1991-92	1992-93
			(Rs in crores)	
1.	Atomic Energy	1206.31	1279.06	1399.09
2.	Space	386.22	457.45	490.92
3.	Electronics	107.21	121.10	87.12
4.	Non-Conventional Energy Sources	111.76	128.85	126.56
5.	Biotechnology	59.35	64.03	76.13
6.	Science and Technology including Survey of India and India Meteorological Department	232.36	251.34	278.17

7.	Department of Scientific and Industrial Research (including grants given to Council of Scientific and Industrial Research)	239.03	258.08	286.38
8.	Ocean Development	32.71	39.83	45.53
9.	Environment and Forests including Zoological Survey of India and Botanical Survey of India	241.35	297.21	316.84
10.	Indian Council of Agriculture Research	306.48	328.60	355.46
11.	Indian Council of Medical Research	45.84	46.97	53.94
12.	Centre for Development of Telematics (C-DOT)(Deptt. of Telecommunications)	21.16	25.80	42.06
13.	National Informatics Centre (Planning Commission)	38.85	41.12	58.16
14.	Geological Survey of India (Department of Mines)	85.85	91.18	105.14
		3114.48	3430.62	3721.50

Important results of the audit of public moneys spent by these agencies of the Government of India and the institutions controlled by them which engage predominantly in science and technology, have been given in this Report.

1.1.12 Excess and savings in expenditure

The summary of Appropriation Accounts, i.e. expenditure during 1992-93 against approved demands (grants and appropriation), in respect of the scientific departments/major scientific organisations, mentioned above, is given below:

S. No.	Ministry/Deptt./ Organisation	Grant/ appropriation (including supplementary)	Expenditure	(-) Saving (+) Excess
		(Rs in crores)		
1.	Atomic Energy	1558.35	1399.09	(-) 159.26
2.	Space	513.08	490.92	(-) 22.16
3.	Electronics	105.38	87.12	(-) 18.26
4.	Non-Conventional Energy Sources	128.95	126.56	(-) 2.39
5.	Biotechnology	83.74	76.13	(-) 7.61
6.	Science and Technology including Survey of India and India Meteorological Department	295.41	278.17	(-) 17.24
7.	Scientific and Industrial Research (including grants given to Council of Scientific and Industrial Research)	290.68	286.38	(-) 4.30
8.	Ocean Development	51.05	45.53	(-) 5.52
9.	Environment and Forests, including Zoological Survey of India and Botanical Survey of India	319.37	316.84	(-) 2.53
10.	Indian Council of Agricultural Research	373.30	355.46	(-) 17.84
11.	Indian Council of Medical Research	52.83	53.94	(+) 1.11

12. Centre for Development of Telematics (Deptt. of Telecommunications)	49.50	42.06	(-) 7.44
13. National Informatics Centre (Planning Commission)	46.00	58.16	(+) 12.16
14. Geological Survey of India (Department of Mines)	99.83	105.14	(+) 5.31

1.1.13 Adverse balances in the Finance Accounts

In Statement No. 13 of the Finance Accounts of Union Government for the year 1992-93, there were adverse balances, as shown below, under the different Civil Deposit heads, which normally close with credit balances as deposits are received under these heads on account of security deposits etc.

S.No.	Ministry/ Department	Closing Debit Balance as on 31 March,1993
		(Rs in thousands)
1.	Ministry of Science and Technology: 8443 - Civil Deposits - Security Deposits	1459
2.	Department of Electronics: 8443 - Civil Deposits - Other Deposits	2
3.	Department of Space: 8443 - Civil Deposits - Personal Deposits	4160
4.	Ministry of Environment & Forests: 8443 - Civil Deposits - Security Deposits	605

Debit balances which could be due to excess refunds or misclassification and non-reconciliation of Accounts require detailed investigation and rectification. The

Departments/Ministries stated that the matter was being taken up with the Pay & Accounts Offices for necessary rectification.

1.1.14 Audit of Accounts of autonomous bodies

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 relevant 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 31 March 1993, Accounts of the 38 autonomous bodies receiving recurring grants from the Scientific Departments of Government of India, as indicated in *Appendix I*, were required to be audited by the Comptroller and Auditor General of India.

The audited annual Accounts of six autonomous bodies viz. Sree Chitra Tirunal Institute of Medical Sciences and Technology, Indian Council of Agricultural Research, Indian Council of Medical Research, Council of Scientific and Industrial Research, Wildlife Institute of India and Central Zoo Authority of India, alongwith Separate Audit Reports on their accounts for 1992-93, have been sent to them and to the concerned Departments/Ministries. Separate Audit Reports on the Accounts of the remaining 32 bodies are not required to be prepared. The Accounts for 1992-93 of 18 of these 32 autonomous bodies have not been received for audit, including Accounts for some of the years prior to 1991-92. Their names are given in *Appendix II*.

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 986.19 crores were outstanding as per details given in *Appendix III*. Some of the certificates are outstanding from 1976-77 onwards. The Departments would need

to look into this at the highest level and obtain the certificates or recover the amounts.

1.3 Follow up action

The Lok Sabha Secretariat issued instructions (April 1982) to all the Ministries/Departments requesting them to furnish notes to the Ministry of Finance (Department of Expenditure) indicating remedial/corrective action taken by them on the various paragraphs contained in the Audit Reports of the Comptroller and Auditor General of India as soon as they are presented to the Parliament.

A review of the 'Action taken notes' received during 1992-93 revealed that the concerned Ministry/Department did not indicate adequate remedial/corrective action in respect of the following paragraphs in the Report of the Comptroller and Auditor General of India: Union Government (Scientific Departments) for the year ended 31 March 1991, No.2 of 1992:

Para No.	Subject
11.3	Cost and time overrun in setting up a facility **(DOS)**
12.3	Delayed payment of decreed amount **(ICAR)**
12.5	Excess payment for electricity consumed **(ICAR)**
12.6	Avoidable extra expenditure **(ICAR)**
12.7	Recurring loss on unused asset **(ICAR)**
12.9	Non-installation/delay in installation of equipment **(ICAR)**
14.12	Non-commissioning of imported equipment **(CSIR)**

A mention regarding non-submission of 'Action taken notes (ATNs)' on 22 paragraphs appeared in the Audit Reports of the Comptroller and Auditor General of India: Union Government (Scientific Departments) for the years ended 31 March 1987 to 1991, was made in the Audit Report for the Year ended 31 March 1992 and followed up subsequently. The

progress in submission of ATNs on pending audit paragraphs to Audit is, however, not encouraging as only 11 ATNs have so far been received and vetted by Audit leaving an outstanding balance of ATNs on 11 paragraphs. In addition, ATNs on the following paragraphs which appeared in the Audit Report for the year ended 31 March 1992 have also not been received for final vetting in audit (February 1994).

Para No.	**Subject**
5.1	Solar Energy Programme **(MNES)**
5.2	Injudicious release of funds **(MNES)**
7.4	Infructuous expenditure on research projects **(DST)**
10.2	Inordinate delay in Frog-culture programme **(DARE)**
12.1	Central Mining Research Station-audit review **(DSIR)**
12.5	Unplanned acquisition of land **(DSIR)**

However, in many cases the departments/organisations have taken remedial measures and improved systems and procedures at the instance of Audit. Some such instances are given below:

- A comprehensive computerised stores accounting procedure has been introduced by C-DOT.

- Department of Atomic Energy has introduced a computerised material accounting information system in all stations/projects which would facilitate perpetual inventory control and prevent unnecessary stock-piling.

- National Bureau of Fish Genetic Resources prepared an ecosystem-wise tentative list of critical species.

- Department of Atomic Energy agreed to assess future requirements of lead material keeping in view the demand for sustaining the ongoing programmes.

- Instructions have been issued by the Department of Space to be more alert in future while placing orders on foreign firms so as to ensure that foreign exchange is released and purchase formalities are completed well

in time, so that order can be placed before expiry of validity of the quotation.

- Survey of India has constituted a Procurement Board consisting of technical experts to vigorously test equipments through field demonstration, before recommending purchase.

- National Chemical Laboratory has started including a royalty clause for charging royalty from users for the processes developed under sponsored projects where bigger benefits are likely to accrue.

- To avoid delay in installation of equipment, National Aeronautical Laboratory has introduced the system requiring the scientist concerned to give complete details of spares, manuals, working environments and infrastructure etc. required for the indented equipment and the tenderers also to stipulate the facilities required for installation and commissioning. Monitoring and review by PERT/CPM and mid-term corrective action whenever necessary has also been introduced.

- Ministry of Non-Conventional Energy Sources which committed itself to a project and released Rs 1.10 crores (March 1987) to Punjab Agro Industries Corporation, got a refund for the whole amount in 1991-92, after the project failed to take off.

- Central Potato Research Institute took up the matter with a foreign supplier and obtained refund of US $ 3273 in May 1993. The Institute had allowed unreasonably high cost to the foreign supplier in the procurement of an equipment.

CHAPTER II

Department of Atomic Energy

2.1 Heavy Water Project, Manuguru

2.1.1 Introduction

In 1980, Atomic Energy Commission (AEC) approved the proposal for setting up three new heavy water plants out of which a two stream heavy water plant at Manuguru (HWP), with a total effective capacity of 185 tonnes per year based on the hydrogen sulphide - water exchange process with an integrated captive power plant (CPP), was sanctioned in 1982 at an estimated cost of Rs 421.60 crores (foreign exchange component: Rs 50.00 crores). The HWP was proposed to be built with indigenous technical know-how on the model and design of the heavy water plant at Kota. Thus, import was restricted to certain critical and important equipments/components. The suppliers and fabricators of the Kota plant were identified as the possible suppliers for the HWP which was scheduled to be completed by April 1988.

In 1989, the plant cost was revised to Rs 661.58 crores (gross). The HWP was commissioned and roduction started in December 1991. The main plant is integrated with a thermal power plant consisting of 3 x 265 tonnes per hour boilers and 3 x 30 MW turbine generators to ensure uninterrupted supply of power and steam required for production of heavy water.

The HWP is headed by a General Manager who is responsible for day-to-day affairs of the plant including regular production of heavy water.

In the Department of Atomic Energy (DAE), the heavy water plants are managed by the Heavy Water Projects Board and the heavy water manufactured and acquired are pooled and costed and released to the nuclear power plants on lease.

2.1.2 Scope of audit

Performance of the HWP during the period 1989-93 and the major reasons for delays in commissioning the plant as well as the cost escalation were reviewed in audit.

2.1.3 Preliminary exercise

It was noticed that the feasibility report prepared for the HWP in November 1981 was not based on adequate studies:

- The feasibility report and the estimates were based on work orders of HWP - Kota but, feed back experience of Kota staff was not available for preparation of estimates.

- The soil and ground water of Manuguru required heavier foundation but this was not taken note of in the preliminary survey.

- Against the requirement of 60-80 MW of power, provision in the feasibility report was made for a power station of 3 x 22 MW only. The capacity of the captive power plant was revised to 3 x 30 MW subsequently.

- For transportation of coal, road transport was suggested in the feasibility report. Later, on the advice of the consultants, it was felt that a ropeway would be a better and economical method of handling coal and accordingly provision was made for this mode.

Administrative and financial sanctions conveyed in September 1982 were not based on detailed estimates, resulting in revision, in 1989, in the estimated plant cost from Rs 421.60 crores to Rs 661.58 crores, i.e. increased by 57 *percent*.

2.1.4 Delays

The zero date for commencement of work on the project was taken as September 1982 and DAE hoped to commission the plant for regular production by April 1988. However, the plant was declared operational only in December 1991. Delay in completion of the captive power plant (CPP) and mechanical portion of the main plant delayed the project by nearly four years. Some of the major factors of delay are discussed below.

(i) Preparation of detailed project report

The project was cleared in August 1980 and the feasibility report prepared in November 1981. Three consultants were appointed by DAE, during August and December 1982, on total management basis. The consultants took roughly about a year to prepare detailed project reports and entered the work area in 1984. Thus, the project commenced more than three years after its clearance. However, DAE stated in February 1994 that clearance by AEC in 1980 was only a clearance in principle and the financial sanction to enable appointment of cunsultants etc. came only in September 1982.

(ii) Completion of mechanical work

As per the agreement with the consultants (Engineers India Limited), the mechanical portion of the work in the main plant was to be completed by July 1987. But, the plant after mechanical completion, was handed over to DAE only in December 1988, after a delay of 17 months.

DAE stated in February 1994 that heavy power cuts imposed by Andhra Pradesh Electricity Board, heavy monsoon floods in 1986, export restrictions in the supplier countries, delayed acquisition of imported components leading to the delay in handing over of the plant. It was also stated that the delay in commissioning was essentially due to non-availability of uninterrupted steam and power as CPP could not be completed ahead of the main plant as originally envisaged.

(iii) Construction of captive power plant (CPP)

As per the contract with the consultants (Tata Projects Limited) , CPP including the external coal handling system was to be completed by December 1987. But, it was handed over only in March 1992 after a delay of five years. A major portion of this delay was attributable to the fact that the firm appointed in April 1984 to supply steam boilers by July 1987, suspended work and filed an insolvency petition in October 1986. Even though the contractor had a fast deteriorating financial position (apparent from their annual accounts and balance sheets), DAE had not taken note of this fact. The issue of insolvency was resolved by DAE by granting a loan of Rs 10.75 crores to the firm and requiring the firm to resume supplies in June 1988. The firm completed supplies by August 1991. Also, another firm, who had been

asked to construct the ropeway for the external coal handling plant resorted to import of ropes without prior clearance of DAE resulting in delay of two years as well as extra cost.

DAE stated in February 1994 that delay in completion of aerial ropeways did not hamper the completion of CPP as alternate arrangement for transport of coal was made. However, no specific reasons were given for delayed completion of CPP which caused the delay in completion of the main plant.

2.1.5 Cost overrun

The initial financial sanction issued in 1982 indicated the project cost as Rs 421.60 crores with foreign exchange component of Rs 50.00 crores. This was revised to Rs 661.58 crores in 1989, with foreign exchange component of Rs 78.59 crores and including estimated cost of operation spares of Rs 14.30 crores to be amortised, registering an increase of 57 *percent*. The total capital cost including interest during construction and excluding cost of spares came to Rs 983.38 crores and the increase with reference to the original estimated cost of Rs 421.60 crores was Rs 561.78 crores or 133 *percent*. DAE attributed the cost overrun to change in the scope of work like providing heavier foundations and other changes in design, drawings and specifications (ranging from 8.74 *percent* to 50.67 *percent*) and escalation due to delay (ranging from 13.60 *percent* to 310.15 *percent*) as per details given below:

Items	Original sanctioned cost	Cost variation Increase due to		Percentage variation compared to original sanctioned cost	
		changes in site conditi-ons,change of scope and speci-fications	escalat-ion	col.3: col.2	col.4: col.2
1	2	3	4	5	6
		(Rs in lakhs)			
Civil structural works	2500	1266.92	2045.35	50.67	81.82
Machinery and equipments	32300	5219.49	10004.85	16.16	30.97
Spares	1660	145.00	225.91	8.74	13.60
Establishment and office contingencies	500	--	700.00	--	140.00
Commissioning expenses	1000	--	3101.50	--	310.15
Plant contingencies	1000	--	1650.00	--	165.00

The delay by about four years in appointment of the consultants and their starting the work contributed significantly to the cost escalation. DAE stated in February 1994 that there was no delay in the appointment of consultants as financial sanction was accorded only in September 1982. However, there was delay in preparation of the feasibility report in which appointment of consultants was recommended.

A fire accident in April 1987 delayed completion of the connected works by over 2½ years also resulting in cost escalation.

Due to slippages in time schedule, the consultants who were appointed on total management basis were retained to complete their relative assignments and were paid Rs 200.82 lakhs as extra remuneration for the period of over-stayal (July 1987 to December 1990).

DAE stated in February 1994 that they could not locate the papers relating to compensation of Rs 83.25 lakhs out of Rs 200.82 lakhs and therefore they were unable to offer any comments.

Mechanical completion of the main plant was delayed by 17 months and the contractors were paid compensation to the tune of Rs 83.25 lakhs in one case, and Rs 6.72 lakhs in another for over-stayal beyond the stipulated period of contract due to suspension of work during October 1986-June 1989.

The contractor entrusted with erection and commissioning of the external coal handling system (for Rs 671 lakhs), unilaterally decided to import of ropes at an extra cost of Rs 115.13 lakhs which was borne by DAE. DAE had also provided financial assistance of Rs 269.89 lakhs to the contractor to complete the work. The work was completed after eight years of its commencement. As a result the contractual commitment of Rs 671 lakhs went up to about Rs 1100 lakhs.

DAE stated in February 1994 that import of ropes was resorted to because guarantees for indigenous ropes could not be assured. It was also stated that they had to assist the contractor financially as there was adverse variation in customs duty and in the conversion rate of the foreign currency. Besides this, time overrun also resulted in further escalations.

The escalation under establishment and office contingencies head was 140 *percent* which was largely due to the fact that 829 persons were employed during 1985 to 1988 for various periods apparently taking April 1988 as the target date for commencement of production. Meanwhile due to stoppage of work on steam boilers between October 1986 and June 1988, there was practically no work on CPP and the work on the main plant was also incomplete, though some of the systems were stated to have been handed over. Thus, progressive

recruitment based on permanent setup standards led to premature engagement of manpower.

DAE stated in February 1994 that overall cost increase of 57 *percent* consists of (i) cost increase due to change of scope-12.5 *percent* and (ii) cost increase due to escalation-44.5 *percent*. It was also stated that increase in cost was unavoidable as financial sanction was based on 1981 cost. Thus, the estimates and targets were not realistic as these were not prepared after taking into account all relevant factors.

Pending full power supply from CPP, 163.83 million units of power was drawn from Andhra Pradesh State Electricity Board **(APSEB)** during 1989-91 at Rs 1481.31 lakhs. The CPP unit I was in operation by October 1989, further strengthened by the commissioning of unit-II in July 1990 and Unit III in August 1991.

2.1.6 Performance of the HWP

The whole plant was handed over in December 1988. As per DAE's own standards the plant was to be commissioned within nine months. But production of heavy water was not started until December 1991.

The production of heavy water was 56 *percent* of the target set for 1991-92. The shortfall was attributed to technical difficulties in operation of CPP. The production data for 1992-93 have still not been furnished to Audit.

The HWP which commenced production in December 1991 has still not been declared commercial and no proforma accounts have been prepared. Thus, the projected 10 *percent* return on capital was neither achieved timely nor can the returns be ascertained on the basis of the present set of accounts prepared by the HWP.

At the time of proposal for setting up the HWP, the estimated cost of heavy water to be produced at Manuguru worked out to Rs 5176 per kg as against US $ 230 to 290 per kg of imported heavy water. But, DAE proposed to fix the lease rate at Rs 3081 per kg and by adopting this lease rate, capital return was expected to be 10 *percent*. However, due to slippages in the project schedules and consequential delay in commencement of production, the cost of heavy water

worked out to Rs 7529 per kg (February 1986). Due to further escalation, the cost would have gone up further - the figures for costing after commencement of production in December 1991 were not produced to Audit (December 1993).

DAE stated in February 1994 that the difference in costs refers to costing by commercial method and conventional method. It was also stated that the grounds for sanction of this projects was strategic and not commercial.

2.1.7 Under-utilisation of facilities

(i) Captive power plant (CPP) - penal charges paid to APSEB

Capacity of CPP was enhanced from 3 x 22 MW to 3 x 30 MW on the ground that the main plant would require 60 to 80 MW of power in addition to steam requirements.

The power plant installed was capable of supplying steam to the requirements of the main plant and also generate 30 MW of power for each unit. However, the actual generation was much lower as shown below:

Year	No. of units put to use	Power to be produced	Power actually produced	Shortfall	Shortfall in percentage
		(In million units)			
1989-90	1	108.000	12.882	95.118	88.07
1990-91	2	435.600	108.090	327.510	75.18
1991-92	2	525.600	173.790	351.810	66.94
1992-93	2	525.600	232.230	293.370	55.82

(NB: One unit was kept as stand-by).

In consequence, penal charges had to be paid to the Andhra Pradesh State Electricity Board (APSEB) for drawal of power in excess of the contracted load. These charges from 1988-89 onwards were as follows:

Year	Penal charges paid	Total amount of bills
	(Rs in lakhs)	
1989-90	280.51	775.77
1990-91	64.80	705.54
1991-92	157.25	738.84
1992-93 (upto July 1992)	66.45	617.93
	569.01	2838.08

Data given below revealed that the HWP had resorted to drawal of power from the grid even at penal rate due to much lower generation of electricity from CPP:

Year	No. of units put to use	Power capacity at 30 MW	Power consumed	Power purchased from APSEB	Total power consumption
				(In million units)	
1989-90	1	108.000	11.477	29.385	40.86
1990-91	2	435.600	88.870	34.098	122.968
1991-92	2	525.600	154.210	35.446	189.656
1992-93	2	525.600	210.730	24.327	235.057

(Note: Out of the three units, one was treated as stand-by)

Since the power plant was designed and erected to meet the steam and power requirements of the HWP, the under-utilisation of CPP also led to escalation of the project cost.

(ii) Hospital building

Manuguru being a remote area, a hospital building was built at a cost of Rs 56.40 lakhs providing out-patient facilities and 50 beds. All medical and laboratory equipments including

the equipment required for surgical operations had been procured and installed in 1989 itself. Air-conditioning was provided for operation theatres and other rooms where needed. Two lifts costing about Rs 7.5 lakhs were also installed. However, only a small portion of the building was in actual use. Thus, most of the expenditure incurred on the hospital building and equipments remained unfruitful.

DAE stated in February 1994 that the facility created had not become operational because of the remote location and Government scales not being good enough.

(iii) Hostel building

A two-storeyed hostel building consisting of 96 rooms (two beds per room) was built for providing accommodation to trainees and staff. Since its construction in 1989, about 15 to 20 persons were stated to be staying in the hostel. Thus, about 80 to 85 *percent* of the living accommodation remained un-utilised.

DAE stated in February 1994 that in the absence of any housing available in the area, it was decided to construct full fledged houses for a large work force which was required for constructing the plant. It was also stated that the hostel would serve to provide temporary accommodation to the personnel of the plant. The fact remains that the living accommodation was lying vacant.

2.1.8 Other avoidable extra expenditure

The project had paid to the collieries for coal of the grade superior to what was actually received. To avoid this, a joint sampling system on the lines of supplies to National Thermal Power Corporation, Ramagundam had been agreed to in June 1991, but was not enforced. Excess payments on this account for three months (October - December 1992) worked out to Rs 79.90 lakhs.

DAE stated in February 1994 that the supplier had now agreed to introduce the joint sampling system for which a formal agreement was being developed.

2.1.9 In sum,

- The feasibility report had many significant deficiencies resulting in major changes and contributing to 57 *percent* increase in the cost estimates.

- The HWP, which was to go into operation by April 1988, started production in December 1991. There were significant delays in completion of mechanical works and construction of captive power plant (CPP).

- The total capital cost including interest during construction came to Rs 983.38 crores as against the revised estimated cost of Rs 661.58 crores. In the absence of full power supply from CPP, the HWP incurred an expenditure of Rs 28.38 crores for power supply from Andhra Pradesh State Electricity Board (APSEB). Slippage in project schedule resulted in payment of extra remuneration of Rs 200.82 lakhs to the consultants and over-stayal compensation of Rs 89.97 lakhs to the contractors. Financial assistance of Rs 269.89 lakhs provided to a contractor to keep ongoing work progressing did not help in avoiding delay.

- The production of heavy water was 56 *percent* of the target set for 1991-92. The shortfall was due to technical difficulties in operation of CPP. The cost of production was initially estimated as Rs 5176 per kg. Due to slippages in the project, this was revised in 1986 to Rs 7529 per kg. Due to escalation, the cost would have gone up further but the figures relating to present cost of production were not provided to Audit.

- CPP, hospital building and hostel set up erected at substantial costs had remained grossly under-utilised.

- Payment for inferior coal at rates prescribed for the superior quality coal is causing huge avoidable expenditure which worked out to Rs 79.90 lakhs for three months.

2.2 Beryllium Pilot Plant

2.2.1 Introduction

Beryllium is a metal used for Space applications and copper beryllium alloy is used in electronics industries. Metallurgy Division of Bhabha Atomic Research Centre (**BARC**) under Department of Atomic Energy (**DAE**) had initiated preparation of the metal and alloy in the year 1970. As per the project report submitted in June 1977, the plant was to work 300 days in a year to produce annually, in single shift operation, 10 tonnes of copper (2 *percent*)- beryllium alloy ingots and 250 kg of vacuum hot pressed (**VHP**) beryllium blocks. The plant was taken up in March 1978 and became fully operational in November 1982. After taking into consideration the shut down time for maintenance and holidays, the plant was to work for 240 days in a year. Accordingly, in October 1982 the annual capacity was revised to 8 tonnes of copper (2 *percent*)- beryllium alloy and 200 kg of VHP beryllium blocks in single shift operation. A memorandum of understanding (**MOU**) was concluded in 1977 between the Department of Electronics (**DOE**), the Department of Space (**DOS**), the principal users of beryllium products, and DAE. As per this MOU, DAE was to set up and operate the plant whereas DOE and DOS were to share the capital investment and running expenses according to a formula. DOE was to lift the entire annual production of copper-beryllium alloy and 50 *percent* of the production of beryllium metal while DOS was to lift the other half of the beryllium metal produced. After the first phase of establishing the technology for producing copper-beryllium was completed, DOE stopped financing the plant from April 1989 as they found that

- Demand for these items was mostly for non-electronics use.
- DOE's plea to set up downstream facilities (for formed products) had been shelved as infrastructure already existed in many industries.
- The production cost was about two times higher than market price.
- Defence had indicated that they had no requirement of Be powder.

- The project team was engaged on development of right grade of beryllium (instrument grade) for Space requirements.

- A new project had been configured by Department of Mines on development of forward products at Hyderabad, to develop various non-ferrous alloys and products and to undertake market development and pilot production with direct interaction with actual users.

Since then the expenditure of the plant has been shared equally by DAE and DOS, except for Government subsidies and staff amenities which continue to be borne by DAE.

2.2.2 Commissioning of the plant

The sanctioned estimated capital outlay of the project was revised from Rs 106.19 lakhs (January 1978) to Rs 127 lakhs (January 1981) and again to Rs 160 lakhs (October 1985). Civil, electrical and ventilation work was completed by May 1982 after a delay of 27 months, at a cost of Rs 70.51 lakhs. The operations in the plant were started in November 1982. The overall delay was attributed to search for a suitable location for the plant, delay in construction work and delay on the part of Maharashtra State Electricity Board.

2.2.3 Finance and Accounts

The capital and revenue expenditure on the plant upto March 1989 were met by DOE and DOS in the ratio of 5:2 based on the MOU, after which DOE stopped financing the plant. Based on the above ratio, the capital expenditure was shared by DOE (Rs 114.30 lakhs) and DOS (Rs 45.70 lakhs). DOE, DOS and DAE shared the revenue expenditure as under:

Year	DOE	DOS	DAE	Total
		(Rs in lakhs)		
1981-89	232.49	94.61	-	327.10
1989-93	-	136.87	136.87	273.74
Total	232.49	231.48	136.87	600.84

The figures for revenue expenditure were yet to be reconciled.

The actual progressive expenditure (capital and revenue) at the end of 1988-89 was Rs 462.43 lakhs. In terms of the MOU, the funding by DOE i.e. 5/7th share came to Rs 330.31 lakhs but the material viz. VHP metal and copper (2 *percent*)-beryllium alloy had not been lifted by that department. As per calculations done by the plant authorities, the cost worked out to Rs 35165 per kg for VHP metal and Rs 800 per kg for the alloy. This could not be compared to market or international prices for want of data, but appeared to be high especially as the plant capacity utilisation was below 6 *percent*. As regards viability of the plant, the plant authorities stated (December 1993) that technical and operational viability of the plant has been demonstrated by continuous production and supply. However, the production of VHP metal and beryllium alloy though stated to be continuous was found to be too meagre.

With increase in demand, the plant was to operate three shifts to achieve a capacity of 1.35 tonnes of contained beryllium per year, with some additional investment on equipment. The plant produced VHP beryllium metal as the main product and the alloys copper (2 *percent*)-beryllium, copper (0.7 *percent*)-beryllium (2.7 *percent*), aluminium (3.5 *percent*)-beryllium master and copper-beryllium master as by-products. But the production lagged far behind the projected demand as well as the estimated capacity of the plant. The plant was never operated beyond a single shift and even single shift capacity production was never achieved. Details of production of VHP beryllium blocks and copper (2 *percent*)-beryllium alloy as against projected or installed capacity, the off-take and the balance in stock are shown in the table given below:

	Year	Projected/ installed capacity (kg)	Actual production (kg)	Percentage of production	Share to be lifted (kg)			Quantity lifted (kg)					Balance in stock (kg)
					DOE	DOS	DAE	DOE	DOS	DAE	DMRL*	Others	
Be	1982-89	1400	103.90	7.42	51.95	51.95	--	-	79.50	8.04	--	-	16.36
	1989-93	800	25.27	3.16	-	12.64	12.63	-	21.93	2.01	-	-	1.33
Total		2200	129.17	5.87	51.95	64.59	12.63	-	101.43	10.05	-	-	17.69

Cu-Be	1983-89	48000	2506	5.22	2506	-	-	-	305.65	60.83	493.60	-	1645.92
	1989-93	32000	1755.50	5.49	-	877.50	877.50	-	51.00	21.50	705.95	99.67	877.38
Total		80000	4261.50	5.33	2506	877.50	877.50	-	356.65	82.33	1199.55	99.67	2523.30

* Defence Metallurgical Research Laboratory, Hyderabad

2.2.4 VHP beryllium metal

As against the total production target of 2200 kg of VHP beryllium metal blocks during 1982-93, the actual production during the period was only 129.17 kg, which means that the utilisation of the plant capacity was less than 6 *percent*. No metal was lifted by DOE though 51.95 kg was earmarked for that department.

While accepting the facts, DAE stated in May 1993 that beryllium being a strategic material, very little technical know-how was available. It was also stated that the project team had to gain experience in each step of the process flow sheet and make necessary changes in the equipment and procedures. As shown in the above table, DOS had, however, lifted 79.50 kg and 21.93 kg of VHP metal during 1982-89 and 1989-93 respectively. This was not according to the MOU as 36.84 kg was lifted by DOS in excess of its quota during 1982-83. The MOU did not stipulate supply of VHP metal blocks to DAE during 1982-89 but 8.04 kg was lifted by DAE. After DOE pulled out, the produce was to be shared equally by DAE and DOS, but DAE had lifted 2.01 kg of metal as against their share of 12.63 kg. DAE stated (May 1993) that as per another MOU between DOE and DAE, the supply/sale of material would be executed by the plant on behalf of DOE. But there were no records to indicate instances in which the supply of material was made on the advice of DOE.

The plant also had in stock 17.69 kg of VHP beryllium metal blocks valued at Rs 6.22 lakhs produced during trial production stage which did not meet the specification grain size and beryllium oxide content. The material was kept aside (17.39 kg) for future use by recycling. DAE stated in May 1993 that about 1.5 kg of VHP metal had been utilised in making beryllium foils for x-ray windows supplied to BARC for performance testing in 1992-93 and the remaining material would be utilised after completion of qualitative testing.

2.2.5 Copper (2 *percent*)-beryllium alloy

As against the total production of 80 tonnes (8 tonnes/year) of copper(2 *percent*)-beryllium alloy during 1983-93, the total actual production during this period was only 4.261 tonnes i.e. utilisatiton of the plant capacity by 5 1/3 *percent*.

As per MOU, DOE was to lift the entire production of 2506 kg of the alloy produced upto 1988-89 but nothing was lifted by that department. DOS had lifted 305.65 kg upto 1988-89 and 51 kg as against 877.50 kg of actual produce during 1989-93. DMRL had lifted the major portion of the alloy: 1199.55 kg. As on 31 March 1993, the balance of alloy was 2523.30 kg valued at Rs 2.02 lakhs. DAE stated that 1450 kg was converted into copper (0.7 *percent*)-beryllium alloy and 550 kg scrap in 1991-92. Thus, there was loss in the process of conversion to 0.7 *percent* alloy valuing Rs 5.80 lakhs at Rs 400 per kg as against the price of Rs 800 per kg of 2 *percent* beryllium alloy.

2.2.6 Copper (0.7 *percent*)-beryllium alloy

In addition to regular production of beryllium and its various alloys, 4405.10 kg of copper (0.7 *percent*)-beryllium alloy was also produced during 1985-92, out of which DAE had lifted 799.74 kg and 2079.38 kg was sold to other parties. The balance stock of alloy as of March 1993 was 1529.98 kg (34.73 *percent* of produce) valued at Rs 6.10 lakhs. The plant authorities stated (December 1993) that this alloy was used by the electronics industry as well as in defence applications. However, during 1992-93 there was no production of this alloy.

2.2.7 Aluminium (3.5 *percent*)-beryllium master alloy

During 1989-93, the total production of this alloy was 344.20 kg, out of which 39.25 kg was lifted by DMRL in 1991-92 and 222.98 kg by other parties during 1991-93. The balance of stock was 81.97 kg worth Rs 1.07 lakhs which was 23.81 *percent* of the produce.

2.2.8 Copper-beryllium master alloy

The plant produced 581.20 kg copper-beryllium master alloy during 1991-93 out of which supply of 368.04 kg was made as under:

Department/party	Quantity(in kg)
DAE	15.26
DMRL	81.23
Others	271.55
Total	368.04

The balance of 213.16 kg (36.08 *percent* of produce) valued at Rs 2.88 lakhs remained at the plant (March 1993).

2.2.9 Non-grounding of solid waste

The Safety Review Committee (SRC) of DAE had recommended (May 1985) construction of a shed for interim storage of the solid waste generated in the beryllium pilot plant in properly sealed containers. The construction of the shed measuring 85 square meters had commenced in June 1987 and was completed in January 1988 at a cost of Rs 1.50 lakhs. The shed was used for temporary storage of the waste solid filled in mild steel drums and encased in a carton. Stored drums and filters were then disposed into RCC containers sealed with waterproof cement. The total area occupied by the waste filled containers was about 50 square metres. These containers sealed with RCC water proof cement were buried in concrete trenches. As per the project report, the solid wastes generated in the plant were required to be disposed of by ground encasement in concrete trenches. DAE stated in July 1992 and May 1993 that the matter was reviewed by health and safety authorities and SRC, and it was decided that the waste would be disposed off by encasement in steel-lined RCC containers on surface which is an alternative to underground disposal and there would be major advantage in easy retrieval for future processing. The period for which grounding was necessary, had not so far been estimated.

2.2.10 DAE did not receive reimbursement of Rs 10.12 lakhs incurred on beryllium metal and alloy pilot plant from DOE though over four years had passed.

2.2.11 In sum,

- There was delay of 27 months in completion of the plant; the capital outlay had increased by Rs 53.81 lakhs (51 *percent*).

- The plant was initially to operate single shift to produce 8 tonnes (8000 kg) per year of copper (2 per cent)-beryllium alloy and 200 kg per year of VHP beryllium metal. Thereafter it was proposed to operate three shifts to achieve a capacity of 1.35 tonnes of contained beryllium per year. The plant has worked only one shift. The production of alloy during last ten years i.e. 1983-93 was 4261.50 kg as against possible 80000 kg. Similarly, the production of VHP beryllium metal during the last 11 years 1982-93 was 129.17 kg as against 2200 kg. Thus, the utilisation of the installed capacity of the plant since 1982 is below 6 *percent*.

- Capital and revenue expenditure till 1988-89 was Rs 462.43 lakhs. After this, DOE dissociated itself from the project without having taken any material. As per the MOU, DOE was to take half the actual produce of VHP metal and the entire production of copper (2 *percent*)- beryllium alloy but did not lift any material.

- Solid waste generated in the beryllium plant was to be properly sealed in containers. Construction of the shed was completed in January 1988. All the containers though sealed with RCC using water proof cement were not grounded in concrete trenches since the inception of the plant till date (May 1993).

2.3 Heavy expenditure due to delay in processing tenders

To meet the frequent power cuts and power failures, Nuclear Fuel Complex (NFC), Hyderabad decided in September 1987 to procure three 2500 KVA captive power plants, estimated to cost Rs 440 lakhs, to be commissioned by February 1989. Tender enquiry was floated in October 1987 in response to which 15 offers were received. A technical evaluation committee was formed in February 1988 to technically evaluate the suitability of the offers. The committee found only six out of the 15 offers technically suitable to the

requirements of NFC. The committee opened the commercial part of the four offers in April 1988 and recommended, in August 1988, placement of purchase order (PO) on a firm 'A'. The order was, however, not placed and offers were re-examined (August 1988) at the instance of NFC. The four firms were requested in November 1988 to quote their revised offers.

The revised offers also could not be finalised due to delay in making enquiries about performances of the equipment offered by these firms, and delay in getting clearance from Directorate General of Technical Development (DGTD) in respect of parts of the generator to be imported. DGTD was approached only in February 1989.

When called upon for the settlement of commercial terms, firm 'A' sought revision of rates due to withdrawal of subsidies by their Government. The firm further stated that spares promised to be imported would be got manufactured by them in India under direct supervision to the satisfaction of NFC and also agreed to provide guarantee on such spares.

As firm 'A' revised their rates after opening of tenders and the second lowest offerer did not respond, the firms were again called upon in June 1989 to quote afresh.

At this stage the lowest offer was rejected for increasing the indigenous part of the components (in lieu of imported ones) of the generators and an order was placed on another firm 'B', a Public Sector Undertaking in January 1990 at a basic cost of Rs 399.49 lakhs excluding taxes and duties and including spare parts.

Finally, the order was placed on this firm by incurring an extra expenditure of Rs 95.64 lakhs in basic cost alone i.e. excluding taxes and duties and including spare parts (basic offer of firm 'B': Rs 399.49 lakhs; basic offer of firm 'A': Rs 303.85 lakhs).

Though the captive power plants were to be commissioned by February 1989, they were actually commissioned in May 1993 and NFC had incurred an expenditure of Rs 426.36 lakhs on hiring of generators till 1992-93.

Thus, delayed decision resulted in an avoidable extra expenditure of Rs 95.64 lakhs besides an additional expenditure of Rs 426.36 lakhs on hiring of generators.

DAE stated in December 1993 that the lowest tender of firm 'A' indicated enhanced use of indigenous parts and was different from the earlier offer. It was also stated that the order was placed on the firm 'B' on the basis of lowest technically suitable offer and not because of price preference. This is not clear as decision on the revised rate quoted by the firm 'A' in November 1988 could also not be taken before expiry of the validity period indicative of faulty processing of purchase cases.

2.4 Extra expenditure due to delay in placement of orders

For procurement of raw materials and other items usable in different projects executed by various divisions of Department of Atomic Energy viz Atomic Minerals Division, Nuclear Fuel Complex, Heavy Water Project etc., purchase orders are placed through Directorate of Purchase and Stores (DPS). Some costly metals like tantalum, drill rods etc. have a very fluctuating market. To avoid the extra expenditure on account of increase in the cost of these metals, it is imperative that purchase orders are placed within the validity of the offers especially when these are firm ones. However, it was seen in test-check that in the following cases the purchase orders were not placed within the validity of the offers resulting in extra expenditure of Rs 7.64 lakhs as discussed below.

(i) Nuclear Fuel Complex (NFC), Hyderabad raised an indent in February 1988 for tantalum sheets of 2 mm thickness in three sizes. DPS issued a tender enquiry in February 1988 and offer of a firm 'C' at a total cost of Rs 6.62 lakhs was found the lowest acceptable. DPS could not place an order on this firm within the validity of offer upto 30 June 1988 and asked all the firms in November 1988 to extend the validity of offer upto January 1989. All the firms revised their prices while extending the validity of offers. DPS issued a fresh limited tender enquiry in June 1989 to the five firms. The purchase order was issued in October 1989 on the lowest offer of another firm 'D' at a total cost of Rs 10.36 lakhs. The material was received in February 1990 and accepted by NFC in June 1990.

Thus, due to delay in placement of the purchase order, DAE incurred an extra expenditure of Rs 3.74 lakhs.

DAE attributed (November 1991 and February 1992) the delay in placement of order to delay in receipt of recommendations from the indenter viz. NFC. DAE further stated, in December 1993, that due to fluctuating metal market, the purchase procedure cannot be altered everytime as the impact of such unsuitable conditions is known only after receipt of proper bids. But, in that case the bids should have been processed quickly so as to place orders within the validity period of the offers.

(ii) Based on immediate requirement in November 1988 of Atomic Minerals Division **(AMD)** for 750 drill rods, public tender was floated in February 1989. Two offers, one from firm 'E' at the rate of Rs 2190 each plus taxes for 400 rods at a total cost of Rs 9.11 lakhs and another from firm 'F' at the rate of Rs 2200 plus taxes for 350 rods at a total cost of Rs 8 lakhs were found suitable (September 1989). The validity of the offer of firm 'E' was upto 9 June 1989 and that of firm 'F' upto 31 October 1989. The approval for purchase was obtained in September 1989.

DPS requested the firms (April 1990) to quote revised rates as the purchase orders on both the firms could not be placed within the validity period.

The offers of the firm 'F' at the rate of Rs 2475 each plus four *percent* central sales tax for 375 rods at a cost of Rs 9.65 lakhs and another firm 'G' at the rate of Rs 2495 each plus four *percent* central sales tax for 375 rods at a cost of Rs 9.73 lakhs were considered suitable and accordingly purchase orders were placed on both the firms in October 1990 at a total cost of Rs 19.38 lakhs. Thus, not placing the orders within the validity periods of the offers and invitation of revised bids resulted in an extra expenditure of Rs 2.26 lakhs, besides delayed procurement of materials. Department of Atomic Energy stated in December 1993 that the purchase orders could not be released within the validity period for want of certain clarifications from AMD. This was not tenable. DPS could have obtained necessary clarification from AMD and placed the orders within the validity of the offers specially when the approval for placing orders had been obtained well in time.

(iii) Heavy Water Project, Manuguru placed an indent in September 1988 on DPS for supply of 250 tonnes of non-ferric and water soluble filter alum, at an estimated cost of Rs 5.50 lakhs. Offer of a firm 'H' at Rs 5.46 lakhs, @ Rs 2100 per tonne plus 4 *percent* central sales tax, with validity upto 20th January 1989 was the lowest one and found technically suitable.

DPS placed purchase order on the firm 'H' in February 1989 one month after expiry of the validity period. The firm 'H' stated that the price of the specified alum had increased from Rs 2100 per tonne to Rs 2730 per tonne from 1st March 1989 due to increase in the price of raw material and sought for increase in the price. Simultaneously, another firm 'I' also increased the price of alum from Rs 2270.85 per tonne to Rs 2978.75 per tonne. The revised price of firm 'H' was again the lowest and the amendment to the purchase order was issued in June 1989 for the increased price of Rs 2730 per tonne. As a result, DPS had to incur an extra expenditure of Rs 1.64 lakhs which could have been avoided had order been placed within the validity period.

In reply to an audit query, DPS stated in July 1991 that the case file which was sent to the Indenting Officer for recommendation had been received by DPS after the expiry of the offer. DAE further stated in December 1993 that the offer of the firm 'H' was valid for one month but their rates were not on firm basis and the rates prevailing at the time of delivery were applicable. This is not tenable. DAE should have asked the firm for a fixed and firm quotation and the offers should have been processed quickly to place purchase orders within the validity periods.

2.5 Excess expenditure due to supply of defective equipment

Directorate of Purchase and Stores **(DPS)** placed a purchase order on a firm in April 1974 for supply, erection, testing and commissioning of four chilled water plants, with complete accessories, by September 1974 at a total cost of Rs 11.30 lakhs with stipulated delivery, erection and commissioning of all the units at the Fast Breeder Test Reactor **(FBTR)** of the Indira Gandhi Centre for Atomic Research **(IGCAR)**, Kalpakkam.

The first and second units supplied by the firm in August 1977 and December 1977 were found to be not in accordance

with the specifications and the third unit received in May 1978 was not tested as it was incomplete. The fourth unit received in May 1978 was found in damaged condition and was sent back to the supplier for rectification. The equipment supplied by the firm did not yield the guaranteed operational results even after rectification by the supplier.

In June 1986, it was decided to cancel the order for the fourth unit and accept the other three units by relaxing the tolerance on power consumption to five *percent*. Accordingly, the purchase order was amended and the revised purchase value was worked out as Rs 8.54 lakhs for three units. The supplier was paid Rs 3.99 lakhs (August 1992). Out of the three units thus accepted, two were installed and commissioned in 1988. The poor performance of the plants kept as a stand-by for emergency requirements led to a situation in which IGCAR was constrained to take a decision (February 1983) for upgradation of the central water chiller plant (**CWCP**) by installation of a 550 TR capacity chiller plant at a cost of Rs 27.50 lakhs to meet the requirements of FBTR. Further, an additional package chiller of 10 TR capacity at a cost of Rs 4.39 lakhs was procured by IGCAR so as to facilitate extension of cooling to avoid tripping of inverters.

Thus, IGCAR had to upgrade CWCP at the cost of Rs 27.50 lakhs besides the expenditure of Rs 4.39 lakhs incurred on procurement of additional 10 TR capacitor due to the defective equipment supplied earlier.

DAE's reply dated 24 November 1993 was silent about the extra expenditure which had to be incurred on upgradation of CWCP due to poor performance of the chiller units.

2.6 Avoidable expenditure due to delay in construction

Power to Fast Breeder Test Reactor (**FBTR**) and other facilities at Indira Gandhi Centre for Atomic Research (**IGCAR**) was fed by a single 25MVA-230KV/33KV transformer installed at Madras Atomic Power Station (**MAPS**). In addition to this, an alternate 33 KV feeder of Tamil Nadu Electricity Board (**TNEB**) power system was provided from January 1977 onwards mainly to cater for construction and FBTR start-up loads. Though TNEB had initially agreed to provide for firm supply of 4 MVA through this 33 KV overhead line for FBTR,

the drawal of power from this line was subsequently restricted by TNEB to 2 MVA. Thus, the normal power supply was only through the 25MVA-230KV/33KV transformer at MAPS.

From the point of safety and future needs of the incoming facilities, IGCAR decided in October 1984 to go in for a reliable stand-by feed by installing another 25MVA-230KV/33KV transformer at MAPS. The advantages of the proposed additional feed from MAPS were that (i) it would be economical compared to a direct 110/33 KV feed from TNEB as the tariff proposed by TNEB was expensive, (ii) the project could be executed within the time schedule and (iii) availability of power could also be ensured as MAPS was connected to TNEB grid. It was also decided at that time that the work would be executed by MAPS under the supervision of the then Nuclear Power Board (NPB).

Based on estimates prepared in 1984, Department of Atomic Energy (DAE) approved the project in September 1985 at a total cost of Rs 78 lakhs. The project was scheduled to be completed in 1987-88 and to be operational during that year itself. In a detailed design and costing of the project carried out in August 1985 which was ignored earlier, it was estimated that the project would cost more by Rs 29 lakhs. DAE revised the cost as Rs 107 lakhs in March 1986 and further revised it to Rs 154.69 lakhs in July 1987 based on a further detailed review by IGCAR. However, actual expenditure was Rs 150.48 lakhs. The upward revision of cost by 93 *percent* was attributable to inadequate estimation and escalation in cost of equipments and civil works.

The project stipulated to be completed by March 1988 was completed only in March 1991. This was due to delay in taking up the work by MAPS and delay in completion of the 33 KV overhead line work, which was to be executed by IGCAR. The work order for this part of the work was issued only in July 1988 with the stipulated date of completion as March 1989. It was, however, completed only in September 1990, delayed by 18 months.

IGCAR had to incur an avoidable expenditure of Rs 37.36 lakhs during April 1988 - October 1991 being the minimum demand charges paid to TNEB for the stand-by 2 MVA line in addition to the cost overrun by Rs 72.48 lakhs. The stand-by line of TNEB was discontinued with effect from November 1991.

IGCAR attributed (August 1992) the delays to (i) delayed supply of material and equipment (ii) major breakdown in MAPS (iii) technical constraints and (iv) progress of civil and other related works and availability of the terminal equipment at MAPS switchyard.

Thus, there was an avoidable expenditure of Rs 110 lakhs besides delay in completion of works as a result of improper planning and coordination.

2.7 Unrealistic assessment of power requirement

Department of Atomic Energy **(DAE)** entered into an agreement with Maharashtra State Electricity Board **(MSEB)** in March 1982 for supply of 550 KVA electrical energy per month for the use of Bhaba Atomic Research Centre **(BARC)** plants located at New Bombay. The contract demand was enhanced to 1865 KVA in March 1983 based on established demand of 1399 KVA.

As per the agreement, DAE was required to pay minimum charges equal to 75 *percent* of the contract demand. Hence payment was made for 1399 KVA (i. e. 75 *percent* of 1865 KVA) per month even though the actual consumption was below the contract demand during the period from September 1984 to July 1988.

A sum of Rs 22.10 lakhs was paid for 1399 KVA per month for the period from September 1984 to July 1988 though the amount payable for the actual consumption for this period was Rs 14.83 lakhs. This resulted in avoidable expenditure of Rs 7.27 lakhs due to incorrect assessment of the energy requirement of the Department.

DAE stated in October 1993 that the contract demand could not be increased systematically as it required changes in equipment, transmission lines by MSEB and considerable follow up, and as such, it was more advantageous to obtain the full power provision initially itself. It was also stated that the payment could not be avoided as the Department needed the power provision to work the plant to full utility and for safe operation.

The reply is not tenable as the Department could have sought for additional supply in excess of the contract demand which

would be made available by MSEB according to the provisions of the agreement. Thus, the fact remains that the contract demand was not assessed on realistic basis resulting in avoidable extra expenditure.

2.8 Avoidable expenditure on washing allowance

The Department of Personnel and Training revised in January 1986, the monthly rate of washing allowance payable to the entitled class of Government servants from Rs 4 to Rs 15.

Department of Atomic Energy **(DAE)** also regulated payment of washing allowance at the monthly rate of Rs 15 to the eligible employees, including those belonging to their constituent units such as autonomous bodies and public sector undertakings etc. upto 31 March 1989. However, by an order dated 21 March 1989, DAE enhanced the rate of payment of washing allowance to Rs 50 per month from April 1989. In October 1990, DAE withdraw the orders of March 1989 and asked its units to pay the washing allowance at Rs 15 per month with the salary of October 1990 onwards. However, no recovery of the amounts already overpaid as washing allowance at the enhanced rate was made. Against DAE's orders of October 1990 some employees union filed an application in the Central Administrative Tribunal **(CAT)** at Madras which stayed, in March 1991 the operation of DAE's direction of October 1990. Accordingly, washing allowance at the enhanced rates continued to be paid to all the eligible employees of DAE and its units. As applications were filed in various CAT benches, DAE preferred to file an appeal in CAT (Principal Bench) at New Delhi to have a uniform and final decision on this problem. CAT in September 1992 upheld the decision taken by DAE in October 1990 of withdrawing the order of March 1989 which enhanced the washing allowance.

DAE directed in May 1993 all its constituent units to regulate the washing allowance at Rs 15 per month with effect from October 1990.

The rescinded order of DAE of March 1989 enhancing the washing allowance resulted in avoidable expenditure of Rs 105.86 lakhs. Accepting the facts, DAE stated in January 1994 that the orders for increasing the washing allowance were issued under the mistaken notion that the Department had the powers to do so. DAE further stated that the Ministry of Finance had agreed as a special case to waive

the recovery of excess payment of washing allowance at the rate of Rs 35 per month for the period from April 1989 to September 1990.

2.9 Departmentally managed undertakings

In the following departmentally managed undertakings functioning under the Department of Atomic Energy proforma accounts on the commercial operations were being prepared every year to monitor their financial viability:

- Nuclear Fuel Complex
- Heavy Water Pool Management
- Rajasthan Atomic Power Station I
- Rajasthan Atomic Power Station II
- Madras Atomic Power Station
- Tarapur Atomic Power Station

upto 16 September 1987

The proforma accounts of Heavy Water Pool Management for the years 1982-83 onwards have not been sent for audit so far despite this fact being mentioned in successive Reports of the Comptroller and Auditor General of India: Union Government (Scientific Departments) since 1987. The Department stated in October 1993 that the preparation of the proforma accounts was in progress.

The proforma accounts of Nuclear Fuel Complex (NFC) for the years 1987-89 were certified in March 1993. The proforma accounts of NFC 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 of return on capital	0.46	8.21

The proforma accounts of NFC for the years 1989-90 and 1990-91 had been received and audit thereof was in progress and the proforma accounts for the subsequent years had not been received by Audit (February 1994).

The figures available in the budget and the Finance Accounts for the years 1990-93 are given below:

	Budget	Actual
	(Rs in crores)	
1992-93		
Revenue expenditure	140.00	133.19
Less receipts	73.04	125.81
Other expenditure	2.30	2.30
Net expenditure	69.26	9.68
1991-92		
Revenue expenditure	162.56	142.55
Less receipts	156.35	128.71
Other expenditure	36.00	35.05
Net expenditure	42.21	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

The expenditure and receipts (Heads 4801, 4861, 2801, 0801) under 'Fuel inventory' and 'Heavy Water Pool Management' reflected in the budget and the Finance Accounts of the Department for the years 1990-93 are given below:

Heavy Water Pool Management

	Budget	Actuals
	(Rs in crores)	
1992-93		
Expenditure	85.73	100.28
Receipts	115.14	15.31
Net expenditure	29.41 (Surplus)	84.97

1991-92		
Expenditure	75.40	71.14
Receipts	79.28	13.77
Net expenditure	3.88 (Surplus)	57.37
1990-91		
Expenditure	77.50	54.28
Receipts	53.05	65.61
Net expenditure	24.45	11.33 (Surplus)

Fuel inventory

1992-93		
Expenditure	221.84	121.87
Receipts	155.32	-
Net expenditure	66.52	121.87
1991-92		
Expenditure	206.00	153.28
Receipts	115.23	-
Net expenditure	90.77	153.28
1990-91		
Expenditure	99.93	124.19
Receipts	124.29	105.83
Net expenditure	24.36 (Surplus)	18.36

Proforma accounts of Rajasthan Atomic Power Stations I and II, Tarapur Atomic Power Station and Madras Atomic Power Station for the year 1987-88 (ending 16 September 1987) have been certified. The figures available in the budget and the

Finance Accounts of the Department for the years 1990-93 are given below:

	Budge	Actuals
	(Rs in crores)	
Rajasthan Atomic Power Station-I		
1992-93		
Expenditure	69.58	64.35
Receipts	18.88	3.58
Net expenditure	50.70	60.77
1991-92		
Expenditure	59.65	59.41
Receipts	33.29	6.94
Net expenditure	26.36	52.47
1990-91		
Expenditure	59.46	54.70
Receipts	21.78	11.17
Net expenditure	37.68	43.53

CHAPTER III

Department of Biotechnology

3.1 Immunological Approaches to Fertility Control

3.1.1 Introduction

In pursuance of the national policy for population control, the Indian Council of Medical Research (ICMR) launched in 1983 a major R&D project for development of contraceptive vaccines using immunological approaches. Primary objective of the project: 'Immunological Approaches to Fertility Control' (IAFC) was to develop safe, efficacious, cost effective, long lasting reversible contraceptive agents. Work on the project was initiated in 1983 as part of the family planning programme and was financed out of grants-in-aid to ICMR by the Ministry of Health and Family Welfare. In April 1987, the project was transferred from ICMR to the Department of Biotechnology (DBT).

The three important components of this programme alongwith research linkages among all implementing agencies are development of:

- female anti-fertility vaccine - Beta human Chorionic Gonadotrophin (BhCG) at the National Institute of Immunology (NII), New Delhi.

- male anti-fertility vaccine - ovine Follicle Stimulating Hormone(oFSH) at the Indian Institute of Science (IISc), Bangalore.

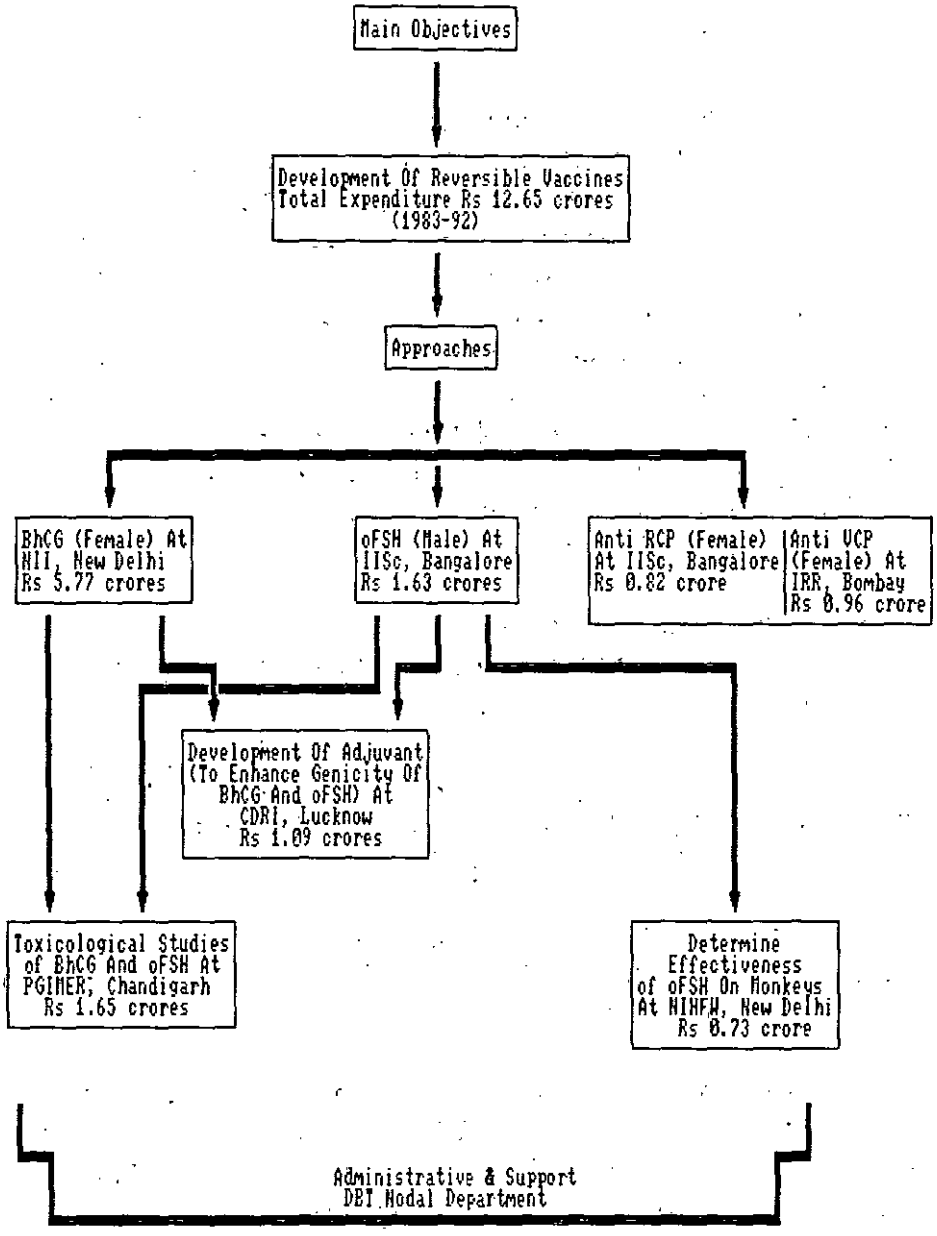
- antibodies against Riboflavin Carrier Protein (RCP) and Vitamin Carrier Protein (VCP) to develop anti-fertility female vaccine, jointly at IISc, and the Institute for Research in Reproduction (IRR), Bombay.

The institutes associated with the support activities were as follows:

Immunological Approaches To Fertility Control

(Objectives, Approaches And Expenditure)

(1983-92)



- Chronic toxicity aspect including histopathological tests of these vaccines before clinical trials being investigated at the Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh.

- Development of suitable adjuvants to enhance the potency/genicity of vaccines both BhCG and oFSH at the Central Drug Research Institute (CDRI), Lucknow.

- Determination of the effectiveness of active immunization with oFSH in producing reversible sterility in male bonnet monkeys and assessing the safety of such procedures at the National Institute of Health and Family Welfare (NIHFW), New Delhi.

3.1.2 Scope of audit

The review is based on test-check of the records relating to the project (IAFC) covering the period 1987-93 at the Department of Biotechnology and in the six institutes connected with the project.

3.1.3 Highlights

- **Main objectives of the project: 'Immunological Approaches to Fertility Control' (IAFC) was to develop a female vaccine (BhCG), a male vaccine (oFSH) and a female vaccine based on Riboflavin Carrier Protein/Vitamin Carrier Protein (RCP/VCP). Subsidiary objectives were to develop adjuvants for using in the female and male vaccines and begin mass scale production of BhCG by recombinant method by March 1992. By November 1993, ten years after the project started, it was noticed that the female vaccine (BhCG) and the male vaccine (oFSH) were still undergoing phase II and phase I clinical trials respectively. The female vaccines based on RCP/VCP was not ready for clinical trials on humans, adjuvants developed by CDRI had not been made use of in female and male vaccines. Mass scale production of BhCG by recombinant method had not yet begun and this would be possible only after successful completion of the research work which is still going on.**

(Para 3.1.6)

Against the sanctioned outlay of Rs 14.63 crores for the period 1983-92, an expenditure of Rs 12.65 crores had been incurred by the agencies involved in research for the project. Due to delays in achieving the targets by the agencies, the project was extended for another five years i.e. 1992-97 at an estimated cost of further Rs 6 crores.

(Para 3.1.4)

NII was scheduled to complete all three phases of clinical trials of BhCG (female vaccine) by March 1992 but only phase I was completed. Further, it was envisaged that processes for production of hCG from natural sources as also through recombinant DNA method would be developed and a pilot plant for the latter would start production by 1990. However, no progress had been made in this regard except that research work in relation to production of BhCG through recombinant DNA method has been started. Due to delay in achieving the targets, an extension for five years (1992-97) had been given to NII at an estimated cost of Rs 4.24 crores.

IISc was scheduled to complete the three phases of clinical trials of oFSH (male vaccine) by March 1992. Data was to be analysed for quality control of vaccines produced for large scale field trials and also to assist the clinical trials of second generation of vaccines. IISc had so far (June 1993) taken up phase I trials and could not analyse the data due to non-receipt of results from its identified field centres. IISc had also not used the adjuvant developed by CDRI. Due to non-achievement of the targets, an extension for five years (1992-97) had been allowed to IISc at an estimated cost of Rs 0.58 crore.

In order to test oFSH (male vaccine) developed by IISc, fertility tests on monkeys had to be carried out by NIHFW by March 1990 but was delayed due to non-availability of proven fertile female monkeys, mating cages, techniques for monitoring cyclicity of female monkeys to determine the ovulatory period and lighting systems. Uniform anti-fertility effect in all immunized monkeys could not be determined finally and reversibility study also could not be undertaken by cohabitation with proven fertile female monkeys. No new

antigen was received from IISc for study. No extension beyond 1992-93 has been given to NIHFW.

Adjuvants developed by CDRI for use in male and female vaccines had not been used by NII and IISc in clinical trials despite recommendations of the Task Force Committee in February 1992. Thus, an investment of Rs 108.77 lakhs (1983-92) on development of the adjuvants by CDRI remained a fruitless exercise. DBT, being the nodal department, while not taking any cognizance of this fact had allowed an extension for another five years (1992-97) to CDRI at an estimated cost of Rs 0.24 crore.

All tests except on rabbits had been carried out by PGIMER. But, due to delay in development of oFSH (male vaccine) at IISc an extension for one year upto 1993 in one case and for five years upto 1997 in another was given to carry out toxicological and histopathological tests at an estimated cost of Rs 0.24 crore.

Another approach included in this project for fertility control was to develop antibodies against RCP and VCP to terminate early pregnancy after fertilisation. IISc was to complete test/research on early pregnancy termination following active immunization with RCP on rodents/primates alongwith other basic studies by March 1990. During 1990-92, the Institute was to consolidate/evaluate primates data to complete toxicity studies on primates and also phase I trials on humans. However, IISc was still conducting tests/research on rodents/primates and could not determine the stage at which pregnancy is interrupted. Further, extension of five years (1992-97) had been given at an estimated cost of Rs 0.45 crore.

IRR was also to undertake research/tests on non-human primates and humans for developing anti-fertility vaccine based on VCP. The Institute could not complete trials on non-human primates so far. Further, toxicity studies and phase I clinical trials had not been initiated. Extension for another five years (1992-97) had been allowed at an estimated cost of Rs 0.20 crore.
(Para 3.1.6)

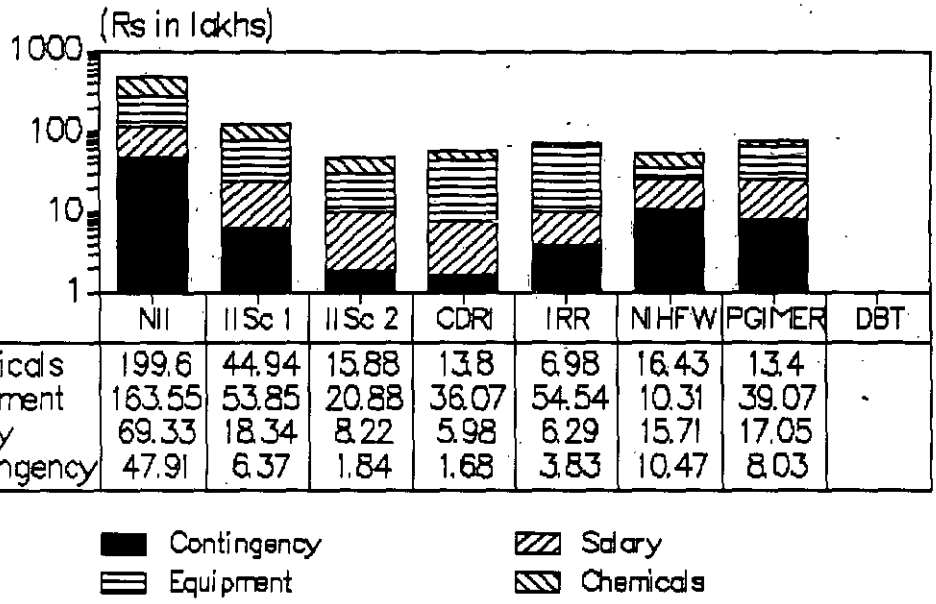
- **Equipment worth Rs 163.55 lakhs had been procured against the sanctioned amount of Rs 134.42 lakhs and equipment costing Rs 94.78 lakhs was procured without approval of DBT.**

(Para 3.1.7)

3.1.4 Budget provision

The Expenditure Finance Committee (EFC) approved the project outlay of Rs 1070.71 lakhs for the period 1987-92 against which the expenditure was Rs 910.35 lakhs. The project was extended for another five years 1992-97. Agency-wise/component-wise expenditure figures for 1987-92 are depicted below:

Agency-wise/Component-wise Break Up Of Expenditure (1987-92)

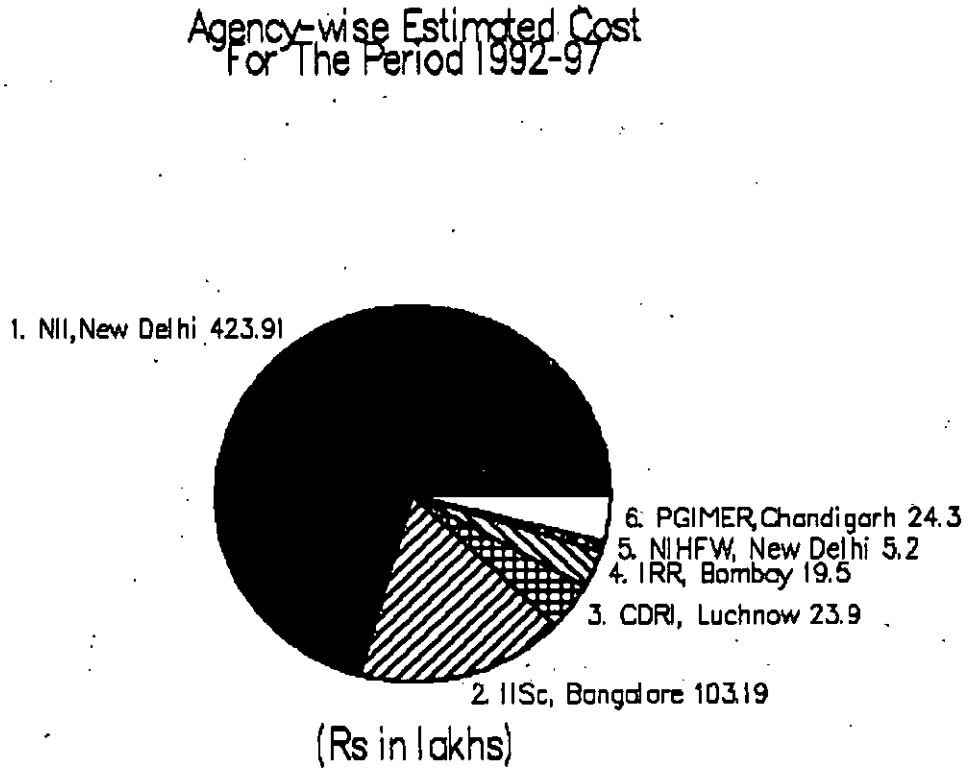


	NII	IISc 1	IISc 2	CDRI	IRR	NIHFW	PGIMER	DBT
Chemicals	199.6	44.94	15.88	13.8	6.98	16.43	13.4	
Equipment	163.55	53.85	20.88	36.07	54.54	10.31	39.07	
Salary	69.33	18.34	8.22	5.98	6.29	15.71	17.05	
Contingency	47.91	6.37	1.84	1.68	3.83	10.47	8.03	

Apart from the above, the project had been funded by ICMR during 1983-87. An expenditure of Rs 354.55 lakhs had been incurred during 1983-87 against a grant of Rs 392.00 lakhs.

The project which was scheduled for completion in 1992 (estimated cost of Rs 14.63 crores for 1983-92) was extended for a period of five years till 1997, at an estimated cost

of Rs 6 crores (total: Rs 20.63 crores including ICMR grant). This was because in almost all the implementing agencies, the set targets had not been achieved. Agency-wise estimated cost for 1992-97 is shown below:



3.1.5 Staff strength

For execution of the project, the total sanctioned manpower was 92 scientific/technical and 55 non-scientific/non-technical against which 65 and 50 persons respectively were in position as of March 1993.

3.1.6 Progress of the project

Main objectives of the project IAFC were to develop a female vaccine, a male vaccine and a female vaccine based on RCP/VCP. Subsidiary objectives was to develop adjuvants for

fortifying the female and male vaccines (BhCG and oFSH) and begin mass scale production of BhCG by the recombinant method by March 1992. By November 1993, ten years after the project started, it was observed that the female vaccine and the male vaccine were still undergoing phase II and phase I clinical trials respectively. The female vaccines based on RCP/VCP was not ready for clinical trials on humans. Adjuvants developed by CDRI had not been made use of in female and male vaccines (BhCG and oFSH). Mass scale production of BhCG by recombinant method had not yet begun and this would be possible only after successful completion of the research work which is still going on.

Position of the project in the six institutes associated with IAFC is discussed in the sub-paragraphs below.

A. National Institute of Immunology (NII), New Delhi

During 1983-92, NII received grants amounting to Rs 577.46 lakhs against which expenditure was Rs 577.13 lakhs.

In addition, Rs 79.86 lakhs and Rs 37.36 lakhs were provided by International Development Research Centre - Canada and Rockefeller Foundation - USA respectively during 1986-92.

The objectives of NII was development of one or more safe and efficient anti-hCG based vaccines which could then be used on a large scale in humans for control of fertility. To achieve this, certain targets (year-wise) for phases I, II and III of clinical trials (1987-92) had been set.

(i) Phase I clinical trials

Between November 1983 and December 1987, pre-clinical toxicology studies on five formulations of birth control had been completed on rodents and non-human primates (bonnet monkeys) and detailed report on the above studies had been submitted to the toxicology review panel of ICMR. Phase I clinical trials commenced in May 1986 and were completed during September 1988. Under phase I clinical trials, 116 tubectomised women were enrolled, out of which 15 could not complete the trials. During phase I clinical trials (May 1986-September 1988), the vaccine was found to be immunogenic and the antibodies generated were of high affinity and could neutralise the bio-activity of hCG *in*

vivo and *in vitro*. The effect of the vaccine was stated to be fully reversible.

NII went in for extension of phase I trials during May 1988 to September 1990 for employing a diversified strategy of tetanus toxoid and diphtheria toxoid as carriers with the objective of obviating the problems of hyper sensitivity following repeated immunization with a given carrier at short intervals.

The extended phase I clinical trials was to be completed on 42 women by June 1989, but was completed by September 1990 on 41 women.

(ii) Phase II clinical trials

Phase I trials showed relatively lower immunogenicity of BhCG formulation. However, data was not clearly indicated for selecting one of the two alternate formulations. In order to step into efficacy trials (phase II) on women (aged 20-35 years) of proven fertility with at least two live children and who had active sexual life, phase II clinical trials were taken up in May 1990 instead of March 1989. The objective of this study was to determine whether immunization with the vaccine prevented pregnancy at all, and if so, the level of antibodies necessary for efficacy.

Each centre was supposed to enrol a minimum of 30 and a maximum of 60 subjects. Of 162 women enrolled, 148 (35 at All India Institute of Medical Sciences, New Delhi, 66 at Safdurjung hospital, New Delhi and 47 at PGIMER, Chandigarh) completed the schedule of three primary injections. The subjects were immunized by giving three primary injections of vaccine at six week intervals. A level of 50 ng/ml (nanogram per millilitre) hCG bio-neutralization capacity was fixed as the threshold and observations were made to cover 750 cycles (menstrual) of total subjects for drawing conclusions.

The study still continues, though it was supposed to be over by March 1991. The Task Force Committee in its meeting in February 1992 discussed the matter and opined that phase II clinical trials should be completed, data collected and analysed before preparation of phase III clinical trials is made. As regards use of recombinant BhCG, permission of the Drug Controller would be required and phase I and phase II

clinical trials would have to be repeated again. Thus, the phase III clinical trials should be continued with same preparation as used in phase II after analysing the results. Simultaneously, a parallel phase I clinical trials with new genetically engineered preparation of BhCG using the adjuvant produced by CDRI should be initiated without loosing any time. NII has not taken any action to begin this parallel phase I trials by using the adjuvant developed by CDRI.

On an enquiry regarding non-use of the CDRI adjuvant in phase I and phase II clinical trials, NII stated in October 1993 that the safety of the adjuvant (MDP 84/246) was not established in experimental animals (between 1986-88) and by that time phase I clinical trials had been started by the Institute. Further, it was also observed by NII that though the adjuvant (MDP 84/246) was earlier found to be of promise in animal studies it had one limitation; it was active only in a water-in-oil emulsion, which was not a stable vehicle. It was therefore not clear whether NII would be able to use the adjuvant developed by CDRI in future also. But, DBT stated in December 1993 that the adjuvant developed by CDRI may find use in future trials.

(iii) Non-production of hCG through natural sources

NII was also required to standardise methodology and to produce gonadotrophin from natural sources. The original plan envisaged training of a scientist at Population Council, New York after which, he was to produce hCG and its sub-units from crude preparation following good manufacturing practice. However, records revealed that the official deputed was not a scientist but a research fellow who on return from training had left the job. Thus, the programme to produce BhCG from natural sources could not become operational. NII stated that making vaccine from natural sources was expensive and from 1987-88 research was started to produce BhCG by the genetic engineering route. Results had been stated as encouraging in the sense that it was feasible to express BhCG by recombinant method but the process needs optimisation before mass scale production could be started. Mass scale production of the recombinant BhCG had neither begun nor its pilot plant established although it was to start by end of 1989 or early 1990. It was observed from the records that during 1988 NII had imported 106 million international units of hCG at a cost of

Rs 16.57 lakhs for production of BhCG through traditional (natural) methods.

It was also observed that storage stability studies which were completed in 1988 were published only in 1989. Results of studies showed that BhCG did not deteriorate on storage at 40°C or at room temperature for one year as tested on rodents. Whether the same results would hold true for humans required to be investigated. Vaccine delivery system which was also to be initiated under the project and was allocated by DBT a separate grant of Rs 29.30 lakhs for three years (1990-93) had not conclusively achieved its objectives so far (November 1993). Due to the delay in achieving the targets an extension for five years (1992-97) had been given to NII at an estimated cost of Rs 423.91 lakhs.

B. Indian Institute of Science (IISc), Bangalore

Study relating to development of the male contraceptive vaccine oFSH is being carried out at IISc. An expenditure of Rs 163.27 lakhs has been incurred during 1983-92 against a grant of Rs 154.06 lakhs.

The objective of research at IISc was to develop an immunological method for fertility regulation in male vaccine (oFSH). Phases I, II and III of clinical trials were to be completed, data analysed to assist in setting up quality control of vaccines to be produced for large scale field trials and in the clinical trials of second generation vaccines.

IISc had so far (September 1993) only taken up phase I trials (since 1992-93) and data had not been analysed due to non-receipt of results from its identified field centres and therefore final outcome of safety and efficacious studies also remained unknown. No other activity could be taken up due to non-completion of phase I trials. Also, the adjuvant developed by CDRI for use in oFSH vaccine had not been tried out by IISc. IISc stated that the adjuvant of CDRI was not cleared for trials on human beings. This statement was not tenable because the adjuvant 86/448 of CDRI was made available to IISc in 1988 as the results were stated to be exciting in rabbits at IISc. IISc had neither presented the data in the Task Force meeting held in December 1989 nor asked CDRI to get approval of the Drug Controller of India to undertake the clinical trials for using the adjuvant

86/448 with oFSH on humans. DBT stated in December 1993 that phase I clinical trials on humans could not be initiated early as the toxicity studies of oFSH were repeated at the instance of expert group and, therefore, the trials on human-beings were delayed. However, the data of phase I clinical trials is now being analysed after making necessary corrections. Regarding use of the adjuvant by IISc, it was stated that the testing of one to two compounds (adjuvants) in restricted experiments, were not conclusive.

An extension of five years (1992-97) had been given to IISc at an estimated cost of Rs 58.40 lakhs.

C. National Institute of Health and Family Welfare (NIHFW), New Delhi

NIHFW was to determine effectiveness of active immunization with oFSH in producing reversible sterility in male bonnet monkeys and to assess safety of such procedures. These objectives were to be achieved in two phases viz. **(a)** to produce sustained anti-fertility effect in monkey which requires immunization followed by studies on semen profile and fertility test and **(b)** to study its reversibility.

Against a grant of Rs 71.74 lakhs, NIHFW spent Rs 72.74 lakhs during 1983-92.

Fertility test on monkeys had not been carried upto March 1990 due to non-availability of proven fertile female monkeys, mating cages, techniques for monitoring cyclicity of female monkeys to determine the ovulatory period and lighting system. However, it was conducted in 1990-91 on eleven male monkeys, out of which only eight responded well. Uniform anti-fertility effect in all immunized monkeys could not be determined finally and reversibility study on immunized monkeys could not be undertaken by cohabitation with proven fertile female monkeys. No new antigen was sent to NIHFW by IISc for its study.

The Task Force Committee recommended in February 1992 extension of one more year, i.e. for 1992-93, to NIHFW provided more monkeys could be included in analysis and further work was to be done on non-responder monkeys. Accordingly, DBT released a grant of Rs 3.27 lakhs for 1992-93. However, NIHFW stated in March 1993 that the recommendation of Task Force Committee could not be

implemented during the extended period (1992-93) because bonnet monkeys were not available in desired numbers and the techniques to work on non-responder monkeys were not available with NIHFW. Still NIHFW spent Rs 3.49 lakhs (salary and contingency) during the extended period i.e. 1992-93 on the work which did not fall within its mandate. Thus, before releasing the grant during the extended period i.e. 1992-93, DBT did not ensure whether the recommendations of Task Force Committee could be met by NIHFW.

No extension beyond 1992-93 for the project has been given to NIHFW as per EFC memo (1992-97).

D. Central Drug Research Institute (CDRI), Lucknow

Main objective of the study and research to be carried out at CDRI was to develop and identify potent and non-toxic adjuvants molecule(s) for incorporation in one or more contraceptive vaccines, which were to be used for clinical trials under the project. An amount of Rs 108.77 lakhs had been incurred on the project against the grant of Rs 107.26 lakhs during 1983-92.

The EFC memo stipulated that the main objective of the work relating to CDRI was to identify potent and non-toxic molecules suitable for incorporation in one or more contraceptive vaccines which are currently at various stages of development in the country. This was to be followed by standardisation of synthetic procedures for getting the compounds on large scale and generation of the required biological data needed for initiation for clinical trials of vaccines containing new adjuvants. CDRI designed and synthesized 35 Glycopeptides during the period April 1983 to March 1992.

An important consideration was feasibility of their synthesis and low production cost. Each and every new compound synthesized by CDRI was evaluated for its immuno-adjuvant activity there. The most promising compounds were later subjected to detailed investigation in different test systems using a number of standard parameters for the immuno-adjuvant activity. Out of these, most active compounds were provided to NII and the programme coordinator (NII) informed that one of the Glycopeptides (MDP 84/246) tested by them was quite active. CDRI synthesized 100 mg of compound MDP 84/246 and made it available to NII in April

1986. NII desired that detailed pharmacological and toxicity study be conducted at CDRI. The encouraging results of the compound were published in NII's Annual Reports for the years 1986-87 and 1987-88. During the period upto March 1991, CDRI gave to NII 600 mg of adjuvant. However, in the Task Force meeting in February 1992, it became clear that NII had not used the adjuvant. In the Task Force meeting held in May 1993, it was for the first time submitted by NII that the adjuvant MDP 84/246 was not so active as to lead to any special advantage by its incorporation in the vaccine.

Similarly, IISc which was also required to use the immuno-adjuvant in order to enhance the antigenicity of vaccine antigen, did not work on the adjuvants synthesized by CDRI, though in both the cases implementing agencies initially had described the compound as active and encouraging.

The Task Force Committee in its meeting held during February 1992 had specifically stated that both BhCG and oFSH based vaccines would require better adjuvants in order to succeed in getting higher and sustained antibody titres. It was also stated that since there are 30 *percent* non-responders, new combination of adjuvants may help to convert some of the non-responders into the responders.

DBT, which was the nodal department for monitoring the progress of the development in these vaccines, did not take any cognizance of the fact that NII and IISc had not utilised the adjuvants synthesized by CDRI. Further, in none of the Task Force meetings upto February 1992 was any attention paid to non-utilisation of new adjuvants synthesized at CDRI.

Thus, the synthesis of the adjuvants at CDRI remained a fruitless exercise. Expenditure to the extent of Rs 108.77 lakhs (1983-92) did not yield any results. Notwithstanding all this, an extension of five years (1992-97) was given to CDRI to develop the adjuvants and the compounds at an estimated cost of Rs 23.90 lakhs. DBT stated (December 1993) that the adjuvants developed by CDRI may find their use in future trials. The basis on which DBT made this statement was not explained to Audit.

E. Post Graduate Institute of Medical Education & Research (PGIMER), Chandigarh

Before clinical use, the formulations developed at NII (BhCG-female vaccine) and IISc (oFSH-male vaccine) had to be subjected to various pre-clinical procedures like toxicological and histopathological tests etc. These tests were to be carried out at PGIMER. The tests under the project were being carried out in two departments (i.e. Department of Pharmacology and Department of Immunopathology) of PGIMER. A sum of Rs 165.30 lakhs had been spent on this project during 1983-92 against the grant of Rs 173.63 lakhs.

Study on rabbits for determining continuation of carcinogenicity/teratogenicity on hCG-CT/TT vaccine could not be started due to non-availability of rabbits. Other tests had been carried out but due to delay in development of oFSH (male vaccine) at IISc an extension of one year upto 1993 in one case and for five years upto 1997 in another case was given to PGIMER, at an estimated cost of Rs 24.30 lakhs, to carry out toxicological and histopathological tests.

F. Development of anti-fertility female vaccine based on RCP/VCP

Another approach included in this project for fertility control was to develop antibodies against Riboflavin Carrier Protein (RCP) and Vitamin Carrier Protein (VCP) to terminate early pregnancy after fertilization. Two agencies viz. IISc and IRR were to carry out this research jointly.

i) Development of anti-fertility female vaccine with RCP at IISc

An expenditure of Rs 81.48 lakhs had been incurred by IISc against a grant of Rs 93.62 lakhs during 1983-92 on the studies on contraceptive vaccine with RCP.

IISc was to conduct research on termination of early pregnancy following active immunization with RCP in sub-human primates and humans during 1987-92. The research on passive and active immunization on rodents and primates to ascertain the earliest time of pregnancy termination, which was to be completed by March 1990, was still in progress

(November 1993). Other basic studies viz. (a) bulk isolation and physico-chemical characterisation of RCP from chicken egg, bovine whey and human amniotic fluid and (b) completion of passive and active immunization with chicken RCP (SDS treated reduced and carboxyl methylated) and immuno-dominant mimetopes on rodents to test the efficacy in terms of early pregnancy termination were still incomplete. IISc could not determine the stage at which the pregnancy is interrupted. Consolidation of primates data on active and passive immunization and evaluation of overall results in primates also remained incomplete. Acute and sub-acute toxicity studies on rodents and primates and phase I clinical trials on humans were to be completed during 1990-92 but had not been initiated so far (November 1993).

An extension of five years (1992-97) had been given to IISc for this project at an estimated cost of Rs 44.79 lakhs.

ii) Development of anti-fertility female vaccine with VCP at IRR

During 1983-92, IRR received a grant of Rs 96.18 lakhs and spent Rs 96.21 lakhs.

To develop an anti-fertility vaccine based on VCP, IRR was to carry out various studies during 1987-92 viz. (a) active immunization of marmosets and synthesis of peptides alongwith its study to elicit neutralizing immunity during 1987-88; (b) characterisation of antibodies developed in chicken Riboflavin Carrier Protein (cRCP) in marmoset and development of alternate approach to vaccine through generation of anti-idiotypic antibodies to cRCP during 1988-89; (c) study of immunized marmosets with synthetic peptides and its effect on the antibodies during 1989-90 and (d) consolidation of primate data, identification of potential vaccine, conduct of toxicity studies and phase I trials on human during 1990-92.

However, it was observed that active immunization of marmosets could not be conducted by January/May 1990 because sufficient number of marmosets were not available. Also, there was no conclusive finding regarding synthesis of peptides which harbours potential epitope for eliciting neutralizing immunity. Further, although identification of bio-neutralizing epitope of RCP had been done through mice, it had not been tried out on marmosets. Alternate approach

to vaccine viz. generation of anti-idiotypic antibodies to cRCP could not be initiated. Monoclonal antibodies to cRCP had not been developed. Therefore, effect of antibodies on fertility of marmosets could also not be completed. Primate data had not been consolidated, potential vaccine based on VCP had not been identified and toxicity studies and phase I clinical trials had not been initiated.

It was also stated by IRR that the equipment i.e. Elisa Reader, Cell Harvestor and CO_2 Incubator required for research under the project could not be procured due to administrative reasons and as such research work to the extent of 30 *percent* was hampered. The project, due to non-achievement of objective, had been extended for another five years (1992-97) at an estimated cost of Rs 19.50 lakhs.

3.1.7 Material management

i) Purchase of equipment and materials

A sum of Rs 306.20 lakhs was allocated to NII for procurement of equipment, chemicals/consumables (including small animals and feed).

ii) Unapproved equipment procured

While procuring the equipment, no heed was paid by NII to ascertain if the equipment had been on the approved list as stipulated in EFC memo.

It was observed that equipment worth Rs 163.55 lakhs had been procured against the sanctioned amount of Rs 134.42 lakhs. Of the procurement valuing Rs 163.55 lakhs, equipment worth Rs 94.78 lakhs were not on the approved list of items. DBT's approval for these items were still awaited (November 1993).

iii) Extra outflow of foreign exchange

It was seen that in 33 cases, equipment was imported on cost insurance and freight (CIF) basis instead of free on board (FOB) basis upto 1989-90 thereby resulting in extra outflow of foreign exchange amounting to Rs 4.87 lakhs.

iv) Non-maintenance of small animal stock and feed account

It was observed from the annual accounts that NII had incurred an expenditure of Rs 1.25 lakhs and Rs 27.07 lakhs for procurement of small animal and feed respectively under the project during 1987-92.

NII stated that it did not have the account of small animals separately for this project or any other project. The small animals facility is a supporting unit for the entire institute. Also, no separate feed accounts were being maintained project-wise by the small animal facility unit of NII.

In the absence of a separate small animal stock account for the project, it could not be ascertained as to how many animals were procured under the project and how many used in other research work, how many died a natural death or were issued or sold. The expenditure of Rs 27.07 lakhs incurred during 1987-92 on feed was not totally related to the grant.

3.1.8 Monitoring mechanism

From December 1986, DBT assumed responsibility for research and development, production and foreign collaboration in the area of vaccines production. It was also entrusted with the responsibility of coordinating implementation of the project IAFC. Since April 1987, DBT has been coordinating project implementation, including release of funds to the participating institutes, interaction with the project investigators and quarterly review meetings to monitor the progress of work. No quarterly review meetings had been held in DBT till January 1993 for the purpose of internal monitoring. DBT expanded its Task Force related area to serve the purpose of internal monitoring. DBT had also appointed a Review Committee comprising of scientists of international recognition under this Task Force Committee to critically review the progress made. Results and progress of each of these implementing agencies were discussed in detail during Task Force Committee meetings. Upto March 1993, twelve such meetings had taken place.

On an enquiry about multiplicity of implementing agencies, DBT stated that the programme was being designed to exclude duplication.

GLOSSARY

Adjuvant:	A compound/chemical which enhances potency of the vaccine
Amniotic:	A vertebrate whose embryos are totally enclosed in a fluid filled sac - the amnion
Antibody:	A protein that is produced as a result of introduction of an antigen and which has the ability to combine with the antigen that stimulated its production
Anti-idiotype:	Antibody against antigen binding portion of an antibody. It may mimic the antigen
Antigen:	A substance (bacteria, virus, vaccine, protein etc.) which can induce immune response when introduced/injected into animals/humans
Antigenicity:	The capacity of an antigen to mount an immune response
Carcinogenicity:	A substance which can induce a tumor/cancer
DNA:	Deoxyribonucleic acid
Epitope: (Antigenic determinant)	That area of an antigen which takes part in antigen - antibody reaction
Gonadotrophin:	Any of several hormones secreted by mammalian anterior pituitary gland that stimulate reproductive activity of the testes or ovaries
Idiotype:	Antigen binding portion of antibody
***In vitro*:**	Outside living organism (test tube or laboratory)

In vivo:	Inside living organism (human body)
Mimetope:	A particular part (epitope) of a molecule similar to a part (epitope) of another molecule
Riboflavin/Vitamin Carrier Protein:	A protein which acts as carrier of riboflavin (vitamin B) or other vitamin
Teratogenicity:	Safety test for next generation
Titre: (Antibody titre)	Measurement/concentration of antibody

CHAPTER IV

Department of Electronics

4.1 Audit review of the Department

4.1.1 Introduction

In March 1971, Department of Electronics (DOE) was constituted as an executive agency for performing secretariat functions and implementing policies laid down by the Electronics Commission set up a month earlier. Since the winding up of the Electronics Commission in May 1989, DOE is responsible for policy formulation as well as policy implementation.

4.1.2 Objectives

The main objectives of DOE are:

- to formulate policy, both promotional and regulatory, and direct its implementation in order to achieve self-reliance and balanced development of the electronics industry;

- to review periodically the actual growth achieved in industrial and R&D capabilities in electronics;

- to technologically forecast and assess the electronics industry through generation of information inputs;

- to identify priorities/thrust areas in electronics, electronic components, materials and processes in the electronics industry, R&D laboratories and academic institutions; and

- to prepare constant forecast of trained manpower requirements in the electronics industry.

4.1.3 Scope of audit

This review covers generally the activities of the DOE for the period 1985-93.

4.1.4 Highlights

- Savings under Plan and non-Plan heads totalling Rs 67.92 crores during 1985-93 were generally due to short release of funds. DOE could not furnish the expenditure in respect of the seven areas for which separate Plan allocation had been made in Seventh Plan. (Para 4.1.6)

- There was no specific strategy/mechanism for R&D funding till March 1992. DOE streamlined guidelines for R&D funding in electronics in March 1992. Even then, the financial control system actually followed was not adequate. Lack of coordination and inadequate planning and monitoring had resulted in lack of follow up in thrust areas under the Plan and non-availability of composite financial data. (Para 4.1.7)

- DOE had sanctioned a total of 683 projects till March 1993 of which 475 projects were completed. However, during 1985-93 a total of 222 projects were completed, in which time overrun in 104 projects and cost overrun in 34 projects were noticed.

  Assets worth Rs 42.79 crores were lying with different executing agencies but their status was not known to DOE.

  Out of the ongoing projects, seven projects with a total value of Rs 5.24 crores were in operation for three to five years beyond their projected dates of completion. Four projects were delayed by more than two to three years whereas funds amounting to Rs 44.34 crores in nine projects did not render productive/fruitful results.

  Although Plan allocation of Rs 407 crores in Seventh Plan was made under seven categories, DOE could not make available the information relating to projects under thrust areas. (Para 4.1.8)

- Shortfall in electronic production and electronics exports in different sectors ranged from 9.6 *percent* to 36.1 *percent* and 17.7 *percent* to 41.1 *percent*

respectively against targets during 1985-93. DOE could transfer know-how/technology in respect of only 76 cases out of 222 projects involving technology development; thus technology transfer in 146 cases was still pending. Further, in three projects, the technology generated was pending commercialisation.

(Para 4.1.9)

- Inadequate and improper exercise of financial control resulted in idle investment in three public sector undertakings. There were defaults in repayment of loans amounting to Rs 34.81 crores by 17 parties, delay in receipt of 2879 utilisation certificates for grants totalling Rs 384.06 crores and heavy outstanding balances of advances worth Rs 27.07 crores

(Para 4.1.10)

- DOE had entered into an agreement with Electronics Trade & Technology Development Corporation Ltd. (ET&T) for procurement of equipment from April 1987. Under this agreement, ET&T had opened letters of credit worth Rs 15.72 crores till March 1992 but corresponding interest accrued (Rs 31.11 lakhs) was not adjusted against the payments made by DOE resulting in loss to DOE.

- Equipment costing Rs 0.42 crore were lying unserviceable. Further, under different laboratories/ centres of Quality Control Directorate, 83 items of equipment were lying unserviceable/surplus or idle for long periods, while at a laboratory a sophisticated computer system worth Rs 8 lakhs was inoperative since July 1991 and at a centre at Aurangabad, a Soviet computer system has not been installed since October 1990.

(Para 4.1.11)

- The software technology parks did not show healthy financial or commercial status by which they could become self-sustaining.

Substantial funds not immediately required by Regional Computer Centre (RCC) Chandigarh and Calcutta and Electronics Research and Development Centre (ER&DC) Trivandrum were released indiscriminately.

Two units viz. Building Division and Centre for Advanced study had considerable technical and administrative manpower but insufficient activity.

(Para 4.1.12)

4.1.5 Organisational set up

DOE is headed by a Secretary to Government of India. An organisation chart showing the secretariat formations and divisions, attached offices including regional laboratories, autonomous bodies and public sector undertakings is given in *Appendix IV*. DOE plans and executes its functions and responsibilities through public sector companies, autonomous bodies and six advisory councils.

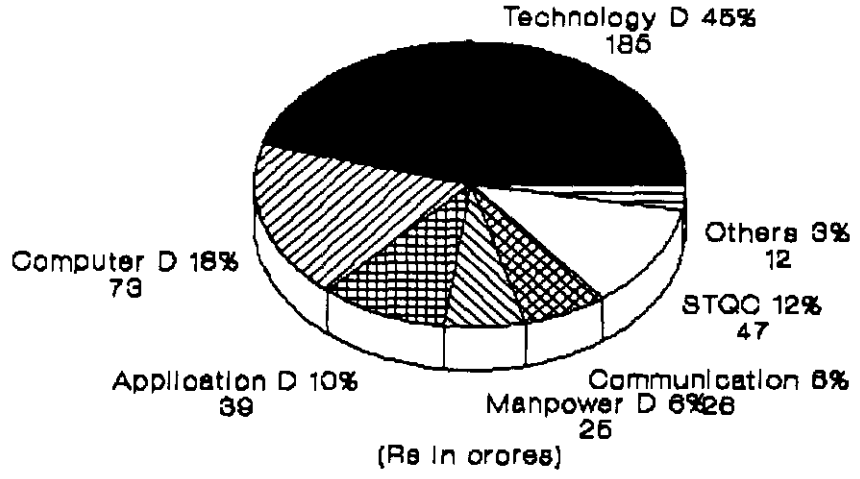
As on 31 March 1993, DOE had 203 scientific/technical personnel and 519 administrative staff against sanctioned strength of 260 and 609 respectively. The ratio of scientific/technical to administrative manpower was 1:2.5. No norms had been fixed for the ratio between scientific and non-scientific personnel.

4.1.6 Financial outlay

To support and implement the projects, programmes and schemes of DOE, an outlay of Rs 407 crores was allocated to the Department during the Seventh Plan (1985-90). DOE could not furnish area-wise expenditure due to non-maintenance of detailed area-wise accounts. The area-wise distribution was as under:

Item	Allocation
	(Rs in crores)
Technology Development	185.00
Computer Development	73.00
Application Development	39.00
Manpower Development	25.00
Communication	26.00
STQC	47.00
Others	12.00
Total	407.00

VIIth Plan Allocation

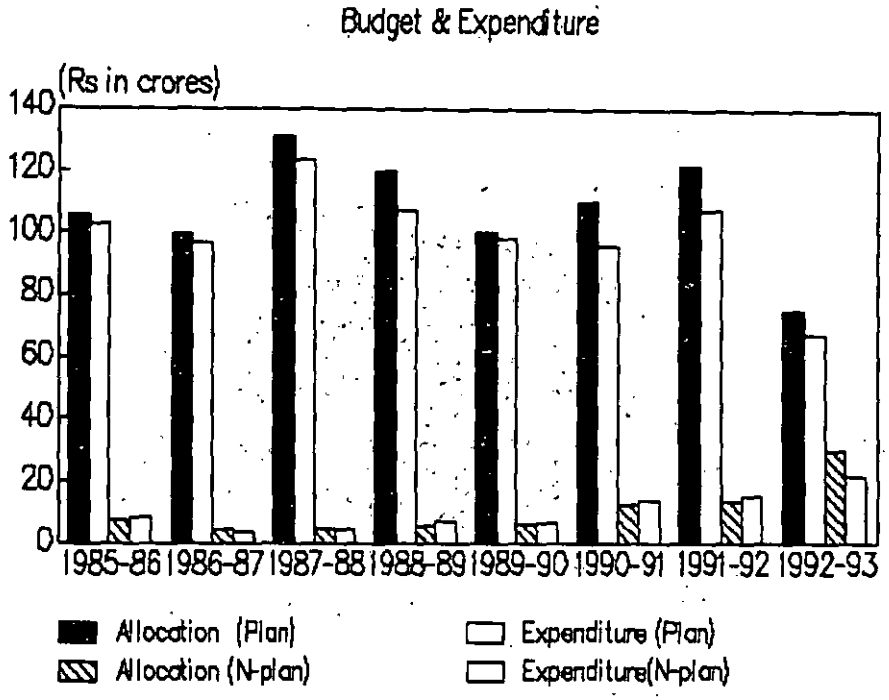


D-Development

The year-wise budget provision vis-a-vis expenditure of DOE was as follows:

Year	Budget provision		Expenditure		Excess(+)/Savings(-)	
	Plan	Non-Plan	Plan	Non-Plan	Plan	Non-Plan
			(Rs in crores)			
1985-86	105.60	7.39	102.64	8.27	(-) 2.96	(+) 0.88
1986-87	99.70	4.55	97.17	3.71	(-) 2.53	(+) 0.84
1987-88	130.93	4.78	123.22	4.39	(-) 7.71	(+) 0.39
1988-89	120.00	5.83	107.33	7.28	(-)12.67	(+) 1.45
1989-90	100.00	6.20	98.43	6.48	(-) 1.57	(+) 0.28
1990-91	110.02	12.32	96.14	13.97	(-)13.88	(+) 1.65
1991-92	121.61	13.34	107.78	15.32	(-)13.83	(+) 1.98
1992-93	75.00	29.90	67.70	19.42	(-) 7.30	(-)10.48
Total	862.86	84.31	800.41	78.84	(-)62.45	(-) 5.47

Savings of Rs 67.92 crores under Plan and non-Plan heads was due to short release of funds.



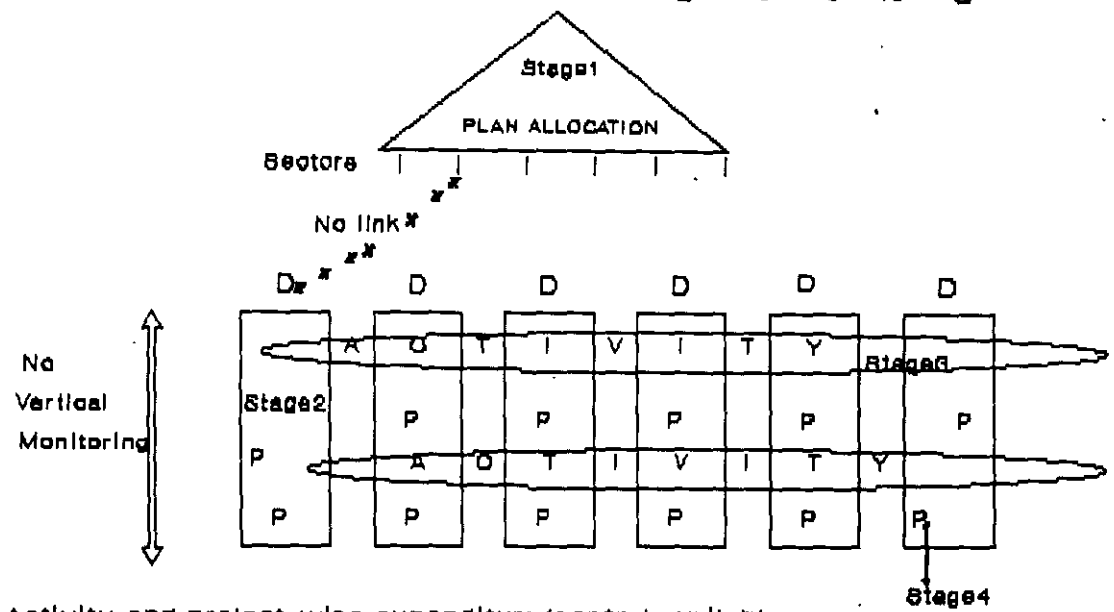
4.1.7 Planning and monitoring

In March 1992, DOE streamlined the guidelines for R&D funding in electronics which envisaged that five councils of the Department would be responsible for all-round development in their respective areas and for preparing technology plans both short-term and long-term. Each council, assisted by several working groups, would receive the specific project proposals from academic institutions, R&D laboratories and production agencies. Project proposals recommended by the working group for favour of funding would be taken up for approval by Secretary, DOE/Standing Finance Committee/Expenditure Finance Committee. It was also laid down that the councils would identify thrust areas from time to time with a view to periodically review technology development plan and thrust areas. The working group would also set up a Project Review and Steering Group **(PRSG)** comprising of experts in the area to meet periodically for assessing the progress of the project. PRSG would also be responsible for making necessary recommendations for transfer of know-how to DOE for further necessary action.

The financial control system actually followed in DOE was that funds were released on R&D projects sanctioned by the respective divisions/councils and each project was being monitored by PRSG constituted for monitoring individual projects. Divisions were to monitor and control the expenditure of various projects under them but there was no link between budget allocation and Plan parameters. In order to achieve objectives of Seventh Plan period, DOE had outlined seven areas in its Plan outlay. Though area-wise distribution of funds was made, expenditure under the seven priority areas as categories in themselves were not kept segregated so as to be monitored by DOE. The details of all the identified projects under seven categories of the Seventh Plan were not available. DOE had set up a separate division headed by an Economic Adviser who had been dealing with economic policy, Plan coordination and data bank information, but consolidated information in regard to total outlay sanctioned on R&D projects, number of projects sanctioned and actual funds released so far in respect of seven categories of Seventh Plan was not available with the division. In the absence of an apex monitoring mechanism, macro data on costs, duration and output of a project or group of projects could not be ascertained and used by DOE to improve overall performance.

DOE while admitting the facts stated in January 1994 that restructuring of the Department has been implemented which includes creation of R&D Planning and Coordination Division so as to enable better planning and monitoring of activities.

Lack Of Coordination Between Planning And Monitoring



Activity and project-wise expenditure/control available
Plan & Division wise expenditure/control not available
P-Project D- Divisions

4.1.8 Research projects

DOE had sanctioned 683 projects involving a total outlay of Rs 277 crores so far, of which Rs 116.07 crores were spent on the projects completed till March 1993.

During 1985-93, the status of projects/programmes was as under:

Carried over from 1984-85	Undertaken during 1985-93	Completed	Abandoned/ dropped/ terminated	Carried over to 1993-94
94	327	222	3	196

Out of 222 completed projects, there was time overrun in 104 projects ranging from three months to over two years as shown below:

3-6 months	22 projects
6-12 months	28 projects
12-24 months	25 projects
Above 24 months	29 projects

Time overrun was mainly attributed to delay in procurement of equipment and inadequate manpower, which, in turn, escalated the cost of 34 projects by Rs 653.35 lakhs in addition to non-availability of project know-how in time.

Funds sanctioned by DOE usually had a provision for procurement of equipment/machinery for the R&D projects executed by different agencies. Total assets acquired on the R&D projects till March 1993 amounted to Rs 42.79 crores plus assets worth US $ 0.98 lakh (provided by UNDP). The present status and their further utility in respect of completed projects was not known to DOE.

DOE stated in January 1994 that information in regard to assets is maintained though the system may leave scope for improvement. Time and cost overruns are inevitable in a few projects since for successfully implementing projects various built-in constraints such as recruitment of the requisite manpower and procurement of equipment are involved.

Following table depicts the break up of ongoing projects at the end of March 1993:

Year in which project sanctioned	No. of projects
1984-85	1
1985-86	7
1986-87	12
1987-88	9
1988-89	23
1989-90	30
1990-91	49
1991-92	33
1992-93	32

Of the ongoing projects, seven with a total value of Rs 523.58 lakhs were in operation for three to five years beyond their stipulated dates of completion. A few illustrative cases are discussed below:

(i) With a view to prepare video films on electronics course modules for engineering colleges and polytechnics for improving quality of education and in non-electronic area

for improving general awareness of the society especially in the rural sector, a one-year project entitled 'Tele-Teach-Voice' was sanctioned by the Manpower division in March 1988. The project had financial support of Rs 100 lakhs for making 280 films for video instructional software development in four areas.

DOE intimated in January 1994 that project outlay was subsequently limited to Rs 75 lakhs and target was reduced to 210 films.

DOE released an amount of Rs 75 lakhs in March 1988. The committee constituted for monitoring and evaluation of progress of the projects did not review the progress till March 1989. As against the target of 210 films, 162 films were produced upto April 1993 at a total cost of Rs 56.31 lakhs resulting in shortfall of 48 films. An unspent balance of Rs 18.69 lakhs was also not returned by ET&T.

(ii) Under the Appropriate Automation Promotion Programme **(AAPP)**, a project: 'Automation and computerisation of Bhilai steel plant' was sanctioned in January 1986 for automation and computerisation of Bhilai Steel Plant under Integrated Control System of Steel plants. The objectives of the project were **(a)** setting up three laboratories for automation, test and calibration, and electronics; distributed digital control process modules; and computer system for systems engineering group and **(b)** training of personnel. DOE released a grant-in-aid of Rs 1.15 crores in January 1986 without getting approval of the competent authority. Sanction of funds did not stipulate a specified period for completion of the project.

Scrutiny of records revealed that neither was any progress reviewed by DOE nor was the position in respect of utilisation of funds ascertained. In August 1989, Steel Authority of India Limited **(SAIL)** intimated that the project had been abandoned. Instead, implementation had been decentralized and was taking place in various shops of the Bhilai Steel Plant. DOE had not taken any action on this policy of SAIL for changing the mode of implementation of the project without the prior concurrence/approval of DOE. Even after seven years, the status of the project, utilisation of funds was not available. Achievement of objectives of the project and proper utilisation of funds

for setting up infrastructural facilities was also not known to DOE.

DOE intimated in January 1994 that the objectives of the project to set up laboratory for automation, test and calibration and electronic system; and training of engineers were fulfilled but relevant documents in support of final review undertaken by PRSG and evaluation committee to assess achievement of technology were not made available. DOE also could not comment on the policy of SAIL for changing the mode of implementation of the project.

(iii) Ministry of Railways had set up a Centre for Railway Information System (CRIS), a registered society for the purposes of handling all computerisation projects of Railways which included conducting basic and applied research in the field of computerisation, telematics and informatics. Expenditure incurred on R&D activities was to be equally shared by DOE and the Ministry of Railways through grants-in-aid. CRIS had identified seven projects to be undertaken in the first instance.

DOE sanctioned in March 1990 an amount of Rs 20 lakhs to CRIS without any identification of specific projects on which the funds were to be utilised. Further, after release of funds, DOE had not called for any progress reports, utilisation certificates and expenditure statements although three years had lapsed. Status of the R&D activities of the project was not known to DOE due to inadequate monitoring.

DOE did not intimate the final achievement as well as actual utilisation of funds by CRIS even though asked for.

(iv) In February 1979, the Electronics Commission had approved setting up of a Planning and System Engineering (PSE) cell in the Central Mine Planning and Design Institute (CMPDI), Ranchi at an estimated cost of Rs 45.80 lakhs for a period of three years. The expenditure was to be shared by the Department of Coal, the Department of Mines and the Department of Electronics as grants-in-aid, of which DOE's share was Rs 29.30 lakhs. Main objective of the cell was to act as a focal point in implementation of electronics projects in various coal and metal mines. Duration of the project was further extended till March 1990, although the Electronics Commission had approved in March 1985 continuance of PSE cell for second phase at a total cost of

Rs 174 lakhs. Till March 1990, DOE had released grants totalling Rs 120.65 lakhs. Time schedule for completion by March 1990 was not adhered to and the electronification of mines could not be taken up due to late procurement of equipment. DOE conveyed a further sanction for utilisation of unspent balance even after March 1990.

DOE intimated in January 1994 that the utilisation certificate for the period ending March 1993 was received. The statement of expenditure received from the PSE cell showed a total expenditure of Rs 107.75 lakhs carried upto 1991-92 against total grants of Rs 120.65 lakhs.

In July 1990, Coal India Ltd. in their study report had disclosed that quite a large number of systems/equipment imported for electronification of mines were either not installed/commissioned or were lying in a defective condition.

Table given below indicates the delayed projects from among the completed ones seen in audit:

Name of project	Year of commencement	Stipulated date of completion	Actual date of completion/ extended period	Estimated/ actual cost/ expenditure of the project		Reasons for delay
				(Rs in lakhs)		
'Design,development fabrication,installation and commissioning of mesosphere, stratosphere and troposphere Radar' at ISRO, Bangalore and SAMEER, Bombay	January 1987	July 1991	December 1992	530.00	618.30	Due to extra work beyond the original scope carried out by SAMEER.
Development fabrication,installation and commissioning of linear accelerator X-ray machine at SAMEER Bombay and ER&DL, Pune	March 1986	November 1988	February 1991	37.00	45.00	Non-receipt of three port circulator.

Education & research in computer networking at NCST, Bombay.	November 1986	October 1990	Till March 1993	145.00 259.82	Non-availability of space segment for the Satellite based wide area network.
High Definition Radar (SAMEER & TEC)	August 1987	August 1989	July 1992	50.00 41.45	Delay in receipt of materials

Unfruitful expenditure

The expenditure incurred was rendered unfruitful in a number of cases, some of which are discussed below:

(i) Taking into consideration the requirement of mainframe computer systems for various strategic applications in Atomic Energy, Defence, Space, Oil, Energy etc. , the Electronics Commission decided in May 1982 to establish a facility for manufacture of mainframe computers of contemporary design at a total cost of Rs 36 crores. In January 1984, the Electronics Commission further decided that Electronics Corporation of India Limited (ECIL), Hyderabad should start the activity as a separate autonomous unit within ECIL so as to avail of the advantage of the existing infrastructure for computer manufacture which would help in reducing the take off period of the project.

A transfer of technology agreement between DOE and Control Data Indo Asia Corporation - USA was signed in February 1986 and this was endorsed to ECIL for implementation. A memorandum of understanding (MOU) between Department of Atomic Energy/ECIL and DOE was signed in January 1987 spelling out the implementation of the project.

DOE released total loans of Rs 29.45 crores, interest free for three years, and Rs 100.50 lakhs as investment for meeting pre-incorporation expenses of the project, during the period from January 1985 to March 1989. The total loans included an amount of Rs 9.2 crores towards deposit of rupee amounts against USAID grant of US $ 7 million.

The unit set up in July 1986 went into commercial production in February 1990.

Targets of production and sales as per revised estimates vis-a-vis the actuals for the years 1989-92 were as under:

Year	As per manufacturing programme	Revised Estimates				Actuals			
		Production		Sale		Production		Sale	
		Qty	Value	Qty	Value	Qty	Value	Qty	value
						(Rs in lakhs)			
1989-90	50	9	1384	7	1548	4	821	3	700
1990-91	60	9	2534	7	2500	6	2216	6	1600
1991-92	70	6	1150	7	1706	4	920	5	1258

From the above it is apparent that:

- targets fixed were lower than the projections made in the manufacturing programmes, and

- the actual achievement of production and sales had fallen short of the targets.

The poor performance was attributed to shortage of demand for such large systems in the country.

Keeping in view the dismal performance of the project, ECIL decided in July 1991 not to run the unit as a commercially viable proposition and to repay the loan on its own. The final decision on conversion of loans into grants and on management control of the unit was under consideration by DOE in consultation with other ministries and departments of the Government of India. This had resulted in blocking of Rs 30.46 crores besides unfruitful technology import.

(ii) Under 'Special components and materials development programme' a project on Beryllium and Copper-Beryllium (Cu-Be) alloy ingot was undertaken in 1977-78 as a joint project between the Department of Electronics, Department of Space and Department of Atomic Energy with a project cost of Rs 106.00 lakhs, later revised to Rs 160 lakhs in 1985. DOE's share in capital outlay was Rs 114.30 lakhs. DOE was supposed to lift the entire annual production of Cu-Be and 50 *percent* of the production of VHP Beryllium material. DOE decided to withdraw from this project from April 1989. Further details of the Beryllium project are given in Chapter II, paragraph 2.2 of this Report.

DOE's planning for investment in this project was defective *ab initio*. A market survey had been conducted before taking up this project and it was noted that the demand for Cu-Be formed products for electronics applications was substantial. But during subsequent interaction with other users it was found that this material had much wider applications especially in non-electronic sectors. DOE maintained that since the development work to achieve self-reliance in producing Beryllium and the formed products activities had been initiated separately by Ministries of Defence and Mines and Metals, it had withdrawn from the project.

Since inception of the project till its withdrawal, DOE had invested Rs 232.49 lakhs in this project and had not lifted any quantity of either Cu-Be or VHP Beryllium material.

(iii) In March 1987, National Microelectronics Council (**NMC**) sanctioned a project: 'Comprehensive photomask information system' to Central Electronic Engineering Research Institute (**CEERI**), Pilani with a financial outlay of Rs 32.72 lakhs for two years. The project commenced in April 1987 and was completed in March 1992 at a cost of Rs 25 lakhs. PRSG in its meeting held in July 1991 had said that the objective had been achieved to a limited extent as a working software package had been developed which required further refinement to make it commercially viable. No further review was conducted by PRSG and final outcome was not available. Thus, despite time overrun of more than two years the aim of the project which was to computerise the mask making facility could not be achieved, resulting in an unproductive expenditure of Rs 25 lakhs.

DOE stated in January 1994 that the project was meant to develop a software which would computerise the information flow in the mask making process. However, fire at Semi-conductor Complex Ltd (**SCL**), Mohali affected the process as the mask making data required for validation of the software could not be obtained. DOE, however, did not intimate whether PRSG had finally reviewed the progress of the project and brought out their comments on the achievement.

(iv) Rural Electronics division of DOE sanctioned in March 1987 a project: 'Promotion of agro-electronics' with the object of promoting use of electronic instruments in agriculture and related areas to increase productivity and

create awareness among the farming community about the utility of agro-electronic instruments. The project was initiated at a financial outlay of Rs 49.56 lakhs by setting up two pilot centres viz. Kerala Agricultural University, Thrissur (Kerala) and G.B.Pant University of Agriculture and Technology, Pantnagar with an implementation cell at Indian Agricultural Research Institute, New Delhi. A grant-in-aid for the project amounting to Rs 49.56 lakhs was released in April 1987. The scheme was further extended to four new centres in March 1990 with a duration of five years for each centre. Rs 79.56 lakhs were released during 1989-92. Total grants-in-aid released till March 1992 amounted to Rs 129.12 lakhs. The project became fully operational in two centres in Kerala and UP in June 1989 and later four more projects were started in 1991-92. Due to slow progress, DOE decided in March 1992 to close down the two centres at Kalyani and Ludhiana. In July 1992, DOE reviewed performance of all the centres and on account of disassociation of ICAR from the project it was decided to close the project due to non-achievement of objectives. No expenditure statement and accounts had been received from any centre. Records of the Department showed that two centres: Kalyani and Ludhiana had an unspent balance of Rs 10.55 lakhs and Rs 3.15 lakhs respectively which were yet to be refunded.

DOE intimated in January 1994 that efforts were being made to effect recovery of unspent balance and return of assets.

(v) In order to cater to the immediate operational requirements of Air Force and Navy for magnetrons required as spares for high power mobile radar, a project 'Development and engineering of tunable S-band high power packaged magnetrons etc.' proposed by the Central Electronics Ltd (CEL), Sahibabad was sanctioned by DOE in November 1983 at a total cost of Rs 66.25 lakhs over a period of three years. Grants-in-aid amounting to Rs 66.25 lakhs were released during November 1983 to March 1986. Subsequently an additional grant-in-aid of Rs 24.50 lakhs was released in February 1987 bringing the total grants to Rs 90.75 lakhs. Duration of the project was also extended upto March 1989 but the project continued beyond the scheduled period without any sanction from DOE. While reviewing progress of the project in its meeting held in April 1990, PRSG had observed that two tubes made ready by CEL by July 1989 were tested at BEL-Bangalore and were found to be inadequate in delivering full rated power. The

efforts of CEL to improve upon and make magnetrons with targeted specifications did not succeed till April 1990 as the magnetrons developed were not acceptable to the Air Force, thus CEL had not been able to perfect the technology and the committee recommended foreclosure of the project in April 1990. The project was closed in DOE same month, with no tangible gains from grants totalling Rs 90.75 lakhs.

DOE stated that the project resulted in development of design and S-band magnetrons which could be utilised readily whenever the users project their requirements. DOE could not, however, indicate any basis for this statement.

(vi) A project: 'Underwater TV system mounted on self-propelled vehicle' was sanctioned in November 1979 at an overall financial outlay of Rs 21.86 lakhs to Engineers India Ltd (EIL). The project was aimed at facilitating underwater inspection of offshore structure by developing technology to produce indigenous remote controlled inspection vehicle system equipped with CCTV and few other sensors. The project was for three years from the date of sanction of funds which was extended, from time to time, upto March 1987. Total funds amounting to Rs 25.48 lakhs were released. PRSG in its meeting held in April 1987 decided to close the project immediately and place the equipment acquired for the project at the disposal of DOE. PRSG also reported that the project did not come to fruition though the documentation and technology were of basic interest to electronics industry. Since its closure, no further evaluation had been done. The equipment acquired for the project was disposed off through EIL with permission of DOE but no amount had been remitted to DOE so far. Since the technology to produce indigenous remote controlled inspection vehicle system could not be developed to meet the original specifications of the project, the entire expenditure of Rs 25.48 lakhs proved infructuous.

DOE intimated in January 1994 that the project has been successful in generating know-how in this area and has brought out a working model of submersibles. Necessary documents have been passed on to the Department of Ocean Development (DOD) in September 1989. Details of utilisation of the know-how by DOD were, however, not available.

(vii) DOE sanctioned a project: 'Service technician training scheme' in July 1985 at a total outlay of Rs 329 lakhs for

the duration of the Seventh Plan. The scheme was jointly sponsored by DOE and Directorate General of Employment and Training with the main objective to develop necessary skills in the trainees to understand circuits in various electronic gadgets like TV receivers, tape recorder etc. and to equip the youth to gain self-employment opportunities generated by expansion of market for electronic goods. In order to train 2000 technicians (20 per centre) per annum the scheme was introduced at 101 ITIs in 26 states and UTs releasing total funds amounting to Rs 508.80 lakhs upto March 1992.

Performance of the scheme was reviewed in October 1991 which brought out that 2676 students at 67 centres were trained and 251 students could generate self-employment opportunities. The progress in respect of 34 centres was not available. The achievement of trained manpower in 67 centres (2676) had thus fallen short of the target of 6700. DOE decided in August 1992 to suspend the scheme due to shortage of funds.

Thus, besides cost overrun of Rs 179.80 lakhs and time overrun of more than 29 months, the scheme failed to achieve its target of generating trained manpower.

(viii) In December 1986, Micro Electronics Development division of DOE set up an R&D centre for Power Conductor Devices at Bharat Heavy Electrical Ltd **(BHEL)**, Bangalore for developing, manufacturing and supplying devices for power switching and control applications. The project was to be taken up in two phases. Phase I related to creation of infrastructure and had a duration of three years. In phase II, development of batch fabrication of GTOs and special high power devices, augmentation of facilities for power transistors work and study on extension of power capabilities for more than 100 mm dia devices were to be taken up and completed in a period of three years. In May 1987, DOE sanctioned the project with a financial outlay of Rs 237 lakhs. PRSG, in its meeting held in June 1989, had decided that due to time constraints, the 12 MEV facility may be deferred to phase II and augmentation activity be shifted to the University of Pune. DOE revised the financial outlay of the project to Rs 272.38 lakhs in November 1989, sanctioned Rs 256 lakhs for BHEL and Rs 16.38 lakhs to University of Pune. The duration of the project was also extended up to December 1991 due to the following reasons:

- revision of project scope,

- non-completion of building and commissioning of pipe line,

- late procurement of equipment and commissioning of process line, and

- lack of proper mask/aligning facility were some of the factors.

The project at both the centres was shown as completed in December 1991 and final report was received in July 1992. The expenditure incurred on the project was Rs 324.56 lakhs. Time overrun of phase I of the project was accompanied by cost overrun amounting to Rs 52.18 lakhs.

DOE intimated in January 1994 that the final completion report of the project had been reviewed and accepted by them in May 1993. Phase II of the project was under formulation.

(ix) DOE under its technology development projects sanctioned a project: 'Engineering development and productionisation of ferrite dielectric for x-band dual mode ferrite phase shifter' in March 1985 to the Central Electronics Ltd **(CEL)**, Sahibabad at an estimated cost of Rs 58.45 lakhs for a period of three years. Grants-in-aid amounting to Rs 52 lakhs were released during March 1985 to May 1987. The project scheduled for completion by the end of March 1988 was given extension of six months in May 1988 on the recommendation of PRSG. In the last meeting held in August 1988, PRSG recommended formal closure of the project by the end of September 1988 with necessary instructions to CEL to submit the completion report, expenditure statement and utilisation certificate and to refund unspent balance to DOE immediately. CEL submitted the completion report in April 1991 which indicated the technical and financial achievement of the project but the report had not been further evaluated by PRSG to determine the outcome achieved and the possible use of technology for further development. An unspent balance of Rs 31.82 lakhs available at the end of September 1988 had also been irregularly retained by CEL (July 1993).

DOE intimated in January 1994 that an ex post facto approval has been conveyed for the utilisation of amount from the

unspent balance towards the expenditure incurred by CEL between the period September 1988 to March 1993. An unspent balance of Rs 6.22 lakhs was still to be returned by CEL.

Thrust area projects

DOE had outlined seven areas for the Seventh Plan with their respective budget allocations totalling Rs 407 crores. DOE could not, however, make available information relating to projects sanctioned under the thrust areas.

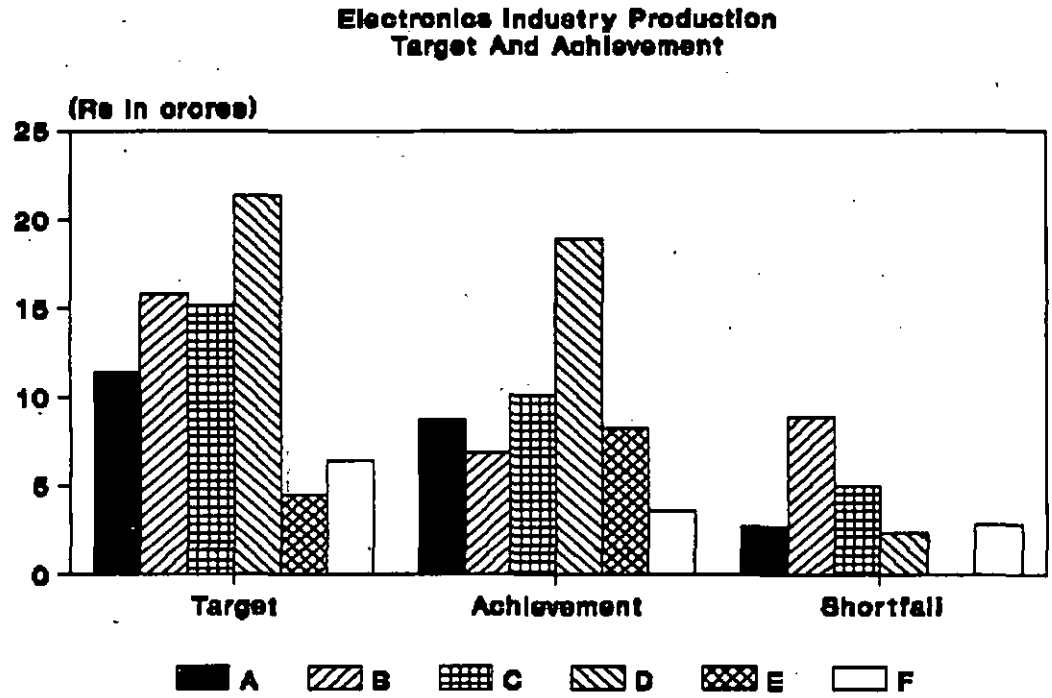
4.1.9 Technology Development

Production and Exports

The electronics industry in India has grown through the joint efforts of both public and private sectors. A major part of strategic electronics and communications sectors are reserved for production in the public sector. In other areas too, public sector units have been playing a dominant role. Given below are graphs and tables depicting the production and export targets and achievement, during the period 1985-93 in the main areas of activity undertaken by DOE. Shortfall in electronics production vis-a-vis its targets ranged from 9.6 to 36.1 *percent* and shortfall in electronic exports vis-a-vis its targets ranged from 17.7 to 41.1 *percent* during 1985-93. The industry had registered an average growth rate of 25.48 *percent* during this period.

DOE stated in January 1994 that the actual shortfall in electronics production vis-a-vis targets ranged from 5 to 35 *percent*. Electronics Industry had achieved a growth of 34 *percent* average cumulative during the Seventh Plan. As regards the period 1990-92, due to foreign exchange crisis and revision in import policy the growth rate of the industry slipped sharply and the very optimistic targets proposed by the Eighth Plan working group could not be achieved.

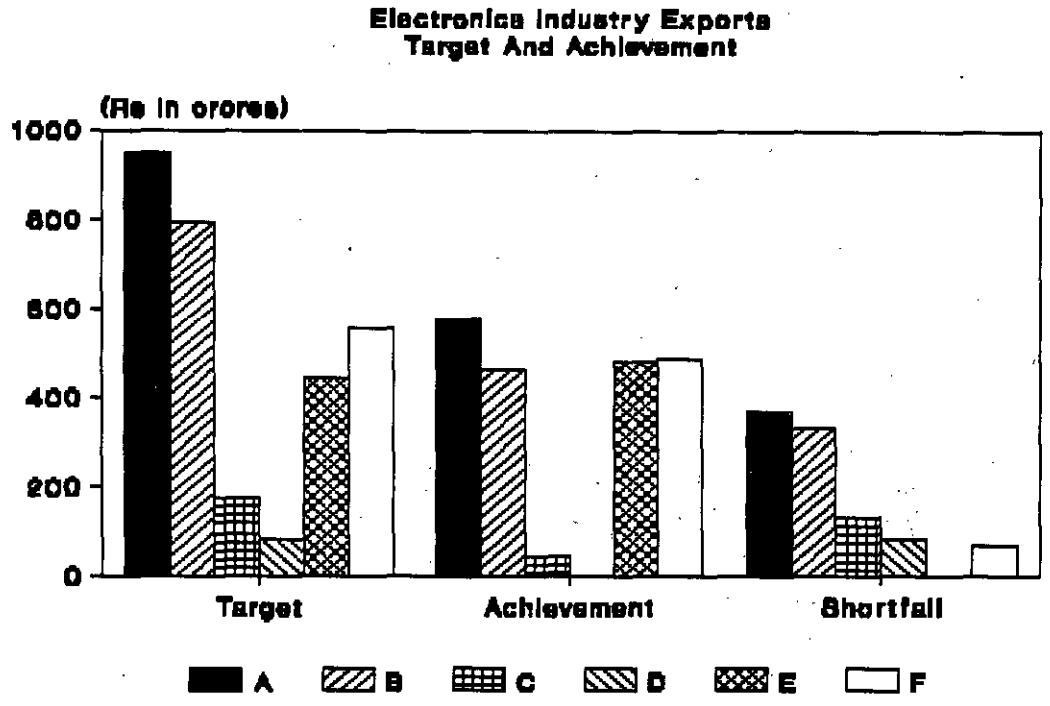
Electronics production



A- Industrial Electronics
B- Communication and Broadcasting
C- Components
D- Consumer Electronics
E- Aerospace and Defence
F- Computer and Office Equipment

Product Sector	Target	Achievement	Shortfall
		(Rs in crores)	
Industrial electronics	11360	8695	2665
Communication and Broadcasting	15750	6920	8830
Components	15120	10070	5050
Consumer electronics	21280	18915	2365
Aerospace and Defence	4490	8180	-
Computers and office equipment	6440	3609	2831
	74440	56389	22741

Electronics Exports (1985-93)



A- Electronic Components
B- Computer Software System Engineering and Consultancy
C- Communication and Broadcasting
D- Aerospace and Defence Electronics
E- Consumer Electronics and others
F- Computer Control System and Instruments

Sector	Target	Achievement	Shortfall
			(Rs in crores)
Electronic components	945	575	370
Computer software System Engineering and consultancy	794	462	332
Communication and Broadcasting	174	43	131
Aerospace and Defence electronics	79	-	79

Consumer electronics and others	441	482	-
Computer control systems and instrumentation	557	487	70
	2990	2049	982

Reasons for shortfall were not intimated though asked for.

Transfer of technology/know-how

In the absence of an apex monitoring mechanism, information in respect of total number of cases where know-how was transferred for commercial production was not available in DOE. However, the records of 14 divisions indicated that know-how in 76 cases had so far been transferred whereas 222 projects involving technology development had been completed till the end of March 1993. Thus, DOE had yet to take action for transfer of know-how in 146 cases.

Non-utilisation of results of projects/technology

In a number of cases, technology generated had remained unutilised for further commercial production. Some examples are as under:

Name of the project	Date of completion	Expenditure	Remarks
		(Rs in lakhs)	
Development of technology for low cost AM/FM	1990	7.24	AM/FM radio sets (imported) were available in market at a lower rate. Hence, no demand.
Automatic data logging system	1982	65.00	Project closed due to poor performance.

Parallel processing technology	1990	2540.00	Poor performance.

4.1.10 Financial Management

DOE had set up a Finance Division headed by a Joint Secretary and Financial Adviser. The Division had been strengthened with a Deputy Financial Adviser, three Assistant Financial Advisers/Deputy Directors, AOs/SOs and two Pay and Accounts Officers. Despite this, while giving clearance for the funds released by the respective divisions, the Finance Division did not keep any separate accounts to indicate the data regarding total number of R&D projects sanctioned, total outlay released for each, actual expenditure incurred and outstanding balances of grants-in-aid, loans etc. The accounts records of the PAO which had never been reconciled with the departmental books were the only source, on the basis of which DOE has been making budgetary allocations activity-wise and monitoring expenditure. There was inadequate financial control resulting in avoidable idle investment in public sector undertakings, default in repayment of loans, delay in receipt of utilisation certificates from grantees and heavy outstanding advances.

As on 31 March 1993, DOE's total investment in Public Sector Undertaking (PSU) amounted to Rs 12260.22 lakhs excluding the disinvested shares amounting to Rs 252.78 lakhs of CMC.

Since 1977-78 DOE had been investing till March 1992 in ET&T, CMC and SCL every year while these PSUs sustained accumulated losses of Rs 748.07 lakhs (ET&T) till March 1991, Rs 175.85 lakhs (CMC) and Rs 580.23 lakhs (SCL) both till March 1992 respectively. Thus, investments made in these PSUs were without reviewing the financial status.

Further, DOE had also released funds amounting to Rs 110.70 lakhs to the Mainframe computer unit under ECIL and Radar system consultancy and production unit. But proper record was not maintained.

Position of loans given by DOE for Scientific Services, Telecommunications and Electronic Industries is given below:

Year	OB as on 1 April	Amount advanced	Total	Amount repaid	Balances as on 31 March	Interest received and credited to Revenue
						(Rs in lakhs)
1985-86	2125.87	1019.68	3145.55	296.94	2848.61	1.39
1986-87	2848.61	1371.37	4219.98	374.34	3845.64	167.14
1987-88	3845.64	2005.64	5851.28	179.03	5672.25	0.11
1988-89	5672.25	2143.66	7815.91	26.33	7789.58	29.10
1989-90	7789.58	419.13	8208.71	70.15	8138.56	0.04
1990-91	8138.56	207.00	8345.56	80.13	8265.43	128.33
1991-92	8265.43	42.50	8307.93	97.87	8210.06	45.99
1992-93	8210.06	48.50	8258.56	361.33	7897.23	35.54

DOE had been sanctioning loans for scientific research in telecommunications and electronics and other related areas, to Central and State public sector undertakings and autonomous bodies of DOE and other Ministries/Departments. Till March 1993, an outstanding balance of Rs 79 crores was shown as loans in the accounts of DOE and 17 out of a total of 30 parties had defaulted in repayment of loans. Outstanding balances of loans and interest worked out to Rs 34.81 crores and Rs 30.01 crores respectively. Two agencies viz. CMC and ET&T had defaulted in repayment of loans amounting to Rs 12.34 crores and Rs 4.57 crores and interest thereon of Rs 10.19 crores and Rs 3.93 crores respectively. The arrears dated from 1980-81. It was, however, observed that substantial loans to following parties were further sanctioned though these parties had already defaulted in repayment of loans:

Hindustan Aeronautics Ltd - Hyderabad,
Computer Maintenance Corporation Ltd - Bombay,
Central Electronics Ltd - Sahibabad,
Electronics Trade and Technology Development Corporation - New Delhi and
Electronics Corporation of India Ltd - Hyderabad.

Sanctioning of fresh loans without effective steps to realise the outstanding ones showed laxity of financial control.

DOE intimated in January 1994 that efforts were being made to effect recovery.

Utilisation certificates for grants-in-aid

DOE had been sanctioning grants-in-aid for R&D projects through its various divisions to different agencies. Terms and conditions attached to sanction of such grants-in-aid provide that utilisation certificates in respect of the funds released by DOE are submitted from time to time so as to review the position by the sanctioning authority. The accounts of DOE, however, were showing 2879 outstanding utilisation certificates for a total value of grants-in-aid of Rs 384.06 crores. These were outstanding since 1976-77 onwards.

The increase in outstanding utilisation certificates indicated lack of financial control and inadequate monitoring of R&D projects by the sanctioning authority.

DOE intimated in January 1994 that efforts were being made to reduce the outstanding utilisation certificates and steps had been initiated to improve the mechanism for monitoring R&D projects.

Outstanding advances

DOE had been making advance payments to private parties and government/semi-government agencies for the services rendered or supplies made. Besides this, contingent advances were also made to officials of the department for purchase of stores, meeting expenditure on seminars/workshops etc. The accounts of DOE exhibited balances of Rs 7.38 crores outstanding since 1989-90 from private parties/government and semi-government agencies and government officials.

In addition to this, DOE had also been making advance payments for deposit works to CPWD for execution of construction work of building for DOE and its subordinate offices. Out of the advance payments made for the deposit works, a balance of Rs 19.69 crores was outstanding for want of adjustment accounts.

DOE intimated in January 1994 that the outstanding advances had been reduced to Rs 15.50 crores as on 31 December 1993 and efforts were on to reduce it further.

Inadequate financial monitoring and non-adjustment of such heavy balances could result in loss of government money.

4.1.11 Stores and stocks

DOE had authorised ET&T to procure all equipment required for DOE, its subordinate offices, laboratories and centres, State Government test and development centres, other autonomous bodies and public sector enterprises which had been funded by DOE. A MOU was signed with ET&T for a period of one year with effect from April 1987 under which ET&T was entrusted with the responsibility of procurement of electronics equipment and in turn ET&T was authorised to charge service charges (3 *percent* of the landed cost), freight charges (5 *percent* of FOB value), clearing/forwarding, LC/Bank charges (6 *percent* of FOB value) and other charges as per actuals. The MOU was extended from time to time. Advance payments in respect of equipment indented by DOE and its attached/subordinate offices/laboratories and centres etc. were made to ET&T. Besides this, advance payments in respect of equipment indented by the State Governments test and development centres(ETDC), autonomous bodies and public sector undertakings were also made to ET&T directly through DOE out of grants-in-aid sanctioned in favour of respective indenters.

In respect of imported equipment STQC Directorate (see para 4.1.12 below) of DOE had advanced money to ET&T for opening of letters of credit amounting to Rs 1572.11 lakhs. Since the delivery period of imported equipment was more than 3 months, opening of letters of credit were required to be made in short-term deposits which would have earned interest of Rs 31.11 lakhs. STQC had no information regarding the interest earned by ET&T on such deposits and had therefore lost interest on such letters of credit opened through ET&T.

While admitting the facts, DOE stated in January 1994 that the matter was being taken up with ET&T.

STQC had been sanctioning grants-in-aid to State Governments, ETDCs for procurement of equipment. ET&T was entrusted with the responsibility of procurement of these equipment. During the period 1985-93, grants-in-aid amounting to Rs 5.09 crores were released. Of this, equipment worth Rs 0.03 crore had not been supplied and equipment worth Rs 0.42 crore was lying unserviceable.

Non-supply of equipment by ET&T and unserviceable equipment lying idle with State ETDCs had not only affected the test and calibration activities but also resulted in a substantial amount being retained by ET&T as interest free resources.

At ETDC Mohali, 29 items of equipment with a total value of Rs 17.85 lakhs were defective and could not be repaired due to non-availability of spare parts.

At two Electronics Regional Test Laboratories (ERTLs), 29 items of equipment and at four ETDCs 25 items of equipment were lying idle. STQC Directorate had not made any arrangements for their diversion to other laboratories/centres for utilisation.

Two ERTLs and two ETDCs had 26 items of equipment which were not fully operative. Total cost of these under-utilised equipment was not available with STQC.

DOE intimated in January 1994 that remedial action was in hand.

ERTL (North) - New Delhi had procured one computer, 'Horizon III' multiuser system, in November 1987 from Hindustan Computers Limited through CMC at a cost of Rs 8 lakhs. The computer had hardware and software problems right from its installation. HCL attended to the problems and suggested a separate earth kit which was prepared and all the terminals of the Horizon III were connected to earth. During the first year of installation, the machine was under warranty and during subsequent years it was under maintenance contract, but after that, the contract was not renewed. As there was no expertise/training to service hardware parts, the system developed a permanent fault and went out of order since July 1991. During November 1991, CMC advised that the system may be again put under maintenance contract and a defective component costing Rs 0.29 lakh replaced, but this was not

done and Horizon III was lying in defective condition as of July 1993.

DOE stated in January 1994 that due to non-availability of spares for one item costing Rs 3.5 lakhs, the system could not be got serviced.

Telecommunication & Broadcasting division, DOE, sanctioned grants-in-aid of Rs 50 lakhs in October 1990 to the Centre for Electronic Design and Technology (CEDT) - Aurangabad for installation of a Soviet Computer System, EC-1046, in its premises. The computer system was received by CEDT in September 1990. CEDT had awarded the construction work of site preparation to CMC paying an advance of Rs 22.64 lakhs in October 1990 but the work was suspended and computer system could not be installed as of October 1993. The computer is lying idle in Marathwada University.

DOE stated in January 1994 that CEDT, Srinagar for whom the computer system was originally procured will suitably place the system at one of the educational institutes which had been using such systems.

4.1.12 Other matters

The **Standardisation Testing and Quality Control (STQC)** Directorate of DOE has been entrusted with the responsibility to provide services in the area of calibration, testing, consultancy etc. to Indian electronics industry through its chain of regional laboratories (**ERTLs**) and State level centres (**ETDCs**) so as to bring them upto an acceptable standard of national/international level. It was observed in Audit that during 1990-93, a sum of Rs 1192.76 lakhs was incurred towards operational expenses of ERTLs and ETDCs whereas revenue earned on account of testing and calibration jobs undertaken by these laboratories and centres was Rs 473.15 lakhs. The Directorate had not laid down any norms for job performance or costing methods for charges and fees.

Software Technology Park (STP) is a 100 *percent* export oriented scheme for development and export of software. DOE established these parks through autonomous societies at Pune, Bangalore and Bhubaneswar in 1990. Software Technology Parks of India (**STPI**) a registered society was set up in June 1991, the earlier three societies were merged into it

in August 1991. STPs at NOIDA, Gandhinagar and Trivandrum were also set up in August 1991. Administrative approval for STP scheme through STPI for Rs 19 crores over a period of three years was accorded in August 1991, according to which the project was proposed to be financed from DOE for three years after which the project would generate revenue for its own sustenance. EFC memo indicated that the facilities set up are supposed to earn a foreign exchange of Rs 30 crores per centre per annum after three years. STPI and STPs incurred an expenditure of Rs 6.39 crores and Rs 32.9 crores (both capital and recurring) during 1991-92 and 1992-93 respectively. Grants-in-aid amounting to Rs 26.67 crores were released to STPI by DOE during the period 1991-93 besides interest-free loans of Rs 1.5 crores during 1992-93.

Physical progress of STPs as on 31 March 1993 revealed that out of 151 complex and 71 private STPs approved by the inter-ministerial standing committee, only 53 public (35 *percent*) and 39 private (55 *percent*) STPs were under operation against which 44 units i.e. 20 *percent* of approved units had started exporting, as a result of which software exports of Rs 16.8 crores and Rs 53.71 crores during the years 1991-92 and 1992-93 could be achieved and the facilities available at STPs remained under-utilised. There was no software export from STPs at Bhubaneswar during 1991-92 and Trivandrum and Gandhinagar during 1992-93 although grants-in-aid amounting to Rs 714.94 lakhs were released to these STPs during 1991-93. The expenditure incurred and revenue generated in respect of seven STPs during 1991-92 and three STPs during 1992-93 was as under:

	1991-92	1992-93
	(Rs in lakhs)	
Expenditure	85.03	42.65
Revenue	16.16 *	5.40*

* includes amount of interest earned from fixed deposits: Rs 9.97 lakhs in 1991-92 and Rs 3.87 lakhs in 1992-93.

Thus, the revenue generated by all the STPs did not show healthy financial status by which they could become self-sustaining.

Indiscriminate release of funds

(i) With a view to promote usage of electronic data processing (EDP), dissemination of knowledge on all aspects of EDP systems and stimulation of R&D in the area of EDP, DOE had been funding two Regional Computer Centres (RCC) at Chandigarh and Calcutta towards augmentation of the existing computer systems or procurement of new computer systems.

In December 1984, an amount of Rs 20 lakhs was released to RCC Calcutta for augmentation of the existing computer system. Additional funds amounting to Rs 105 lakhs were made available in March 1986. Amounts of Rs 20 lakhs and Rs 105 lakhs released in December 1984 and March 1986 respectively remained unutilised till March/April 1988 and RCC Calcutta earned interest of Rs 22.11 lakhs on these amounts. Further, in February 1988 an amount of Rs 162 lakhs was released for payment of customs duty on a new computer system of which actual payment of Rs 139 lakhs was made by RCC-Calcutta, thus leaving an unspent balance of Rs 23 lakhs which DOE permitted in March 1989 for utilisation on installation of the new system.

DOE released Rs 75.00 lakhs to RCC-Chandigarh in January 1986 for augmentation of the existing computer system. Subsequently, in March 1986 the centre intimated the decision of the governing council to procure a new computer system and an additional grant of Rs 104.48 lakhs was released in January 1987. The RCC earned interest of Rs 17.64 lakhs over the unutilised grant of Rs 75 lakhs retained by them which was allowed to be adjusted against the cost of new computer system while releasing Rs 104.48 lakhs.

DOE stated in January 1994 that funds which were not available in one go were given in different spells.

(ii) DOE released Rs 110 lakhs upto March 1991 and Rs 25 lakhs during 1991-92 to Electronics Research and Development Centre (ER&DC), Trivandrum for development of digital, television receivers and multi-functional home information system under the 'Indian national programme for advanced television systems' against which the expenditure incurred upto March 1992 was Rs 3.91 lakhs, thus Rs 131.10 lakhs remained unspent. Out of Rs 107 lakhs released during 1990-91, Rs 88 lakhs were released in last

week of March 1991 for procurement of simulation software for VLSI design of digital TV receivers for various centres but the entire amount remained unutilised till July 1992 when the purchase order was finalised.

ER&DC stated that the major procurements under this grant was initially planned through ET&T but later on after tendering etc. DOE instructed ER&DC to procure directly from the suppliers which resulted in delay in the utilisation of Rs 88 lakhs.

In all these cases it was clear that large amounts not immediately required by these centres were released indiscriminately.

Avoidable expenditure

(i) DOE had set up a building division in July 1987 for management of construction activities of DOE throughout the country including coordination with different bodies such as architects, Central Public Works Department (Ministry of Urban Development), Delhi Electric Supply Undertaking, in connection with construction of DOE's office buildings 'Electronics Niketan' and coordination with autonomous bodies and subordinate offices in connection with their building activities. The division had full engineering and administrative manpower.

CPWD was entrusted with construction works of DOE's main building at New Delhi, ERTL (N) New Delhi and buildings of other subordinate offices at different places in the country. Details of construction works and expenditure incurred on these were not available with the division except for DOE building on which expenditure upto 1990-91 was Rs 18.78 crores.

The building work was delayed by more than two years and resulted in cost escalation, which indicates that this division did not succeed in monitoring building work executed by CPWD. The establishment of a separate building division manned by a technical complement, in the absence of any direct execution of work, had added no value to construction activities of DOE. Expenditure incurred on this division was thus of little value.

DOE accepted the facts in January 1994.

(ii) To support and implement projects, programmes, schemes (in-house and sponsored) relating to Defence, Civil Aviation, ports, meteorology and internal security etc., a division formerly called 'Defence Project cell' was established in DOE in March 1971. Later, its name was changed to Centre for Advanced Study on Electronics (CASE). This division undertook a number of projects till the end of the Sixth Plan. On formation of a new division, System Engineering and Consultancy (SECO), during the Seventh Plan, the activities of CASE diminished. During the Seventh Plan, no new projects were sanctioned to CASE. However, the entire manpower and equipment remained intact and expenditure totalling Rs 392.76 lakhs on salaries and overheads continued to be incurred every year till its ultimate closure in January 1991. Expenditure for the period April 1990 to January 1991 was borne from SECOs budgetary allocation and manpower was transferred to other divisions of DOE after its closure.

Thus, the late closure of a division without having any planned activity during the period 1985 to January 1991 resulted in avoidable expenditure of Rs 392.76 lakhs on salaries and overheads.

DOE intimated in January 1994 that manpower and equipment were utilised for the follow up work on project.

Extra expenditure

The employees of the Society for Applied Microwave Electronics Engineering Research, Bombay (SAMEER) were paid house rent allowance (HRA) at 30 *percent* of basic pay with a ceiling of Rs 2000 from January 1986 onwards. Financial Adviser, Department of Electronics (DOE) (a member of SAMEER's Governing Council) brought to the notice of the Governing Council in their 16th meeting held in March 1989 and April 1989 that employees of autonomous organisations are eligible for HRA as for Government employees. But, this was not kept in view and HRA was continued to be paid at 30 *percent*. An extra expenditure of Rs 34.13 lakhs was incurred on this account.

While accepting the facts, DOE stated in December 1993 that the matter was taken up with SAMEER for implementation of the Government decision and new entrants of SAMEER were paid HRA at Central Government rates from October 1989 and that

the Government decision had been implemented in toto from September 1993.

Loss caused by accident

During February 1989, a fire broke out at SCL-Mohali. The possible reasons of fire which were brought out in the report of the enquiry committee were:

- a careless cigarette end thrown into carton box,.
- over-heated chokes of plastic diffuser tube lights.

DOE stated in January 1994 that the value of the total loss caused due to fire was Rs 56.87 crores for which a claim was preferred with Insurance. However, after adjustment of insurance claim amounting to Rs 52.13 crores, a sum of Rs 4.73 crores had been adjusted in the accounts for the years 1991-92 (Rs 2.22 crores) and 1992-93 (Rs 2.51 crores).

CHAPTER V

Ministry of Environment and Forests

5.1 Infructuous expenditure on hiring of accommodation

Ministry of Environment and Forests (MEF) decided in May 1988 to shift its regional office from Bhubaneswar to Calcutta, and hired office space of 9295 sq ft was allotted to MEF by the Director of Estates, Calcutta at a monthly rent of Rs 3.52 per sq ft, to accommodate the regional office and two field offices.

The accommodation was taken over in March 1989. However, it was decided in June 1989 to continue the regional office at Bhubaneswar but the rented accommodation was retained at Calcutta upto August 1990 on which an expenditure of Rs 5.57 lakhs was incurred on rent and watch and ward which was infructuous.

The matter was referred to MEF in September 1993; their response was awaited (February 1994).

CHAPTER VI

Ministry of Mines
(Geological Survey of India)

6.1 Idling of a costly sophisticated system

Geological Survey of India (GSI), Calcutta had placed orders in 1985, for procurement of a Digital Field System-V. The system was received in May 1988 at a cost of US $ 2.31 lakhs (Rs 40 lakhs). In addition, sub-systems worth Rs 10 lakhs were also procured/fabricated. The equipment was to record and interpret seismic data from blast generated sounds.

Since commissioning of the system in May 1988, the equipment could be utilised only in three spells for five months and since June 1990 the equipment with its sub-systems has been lying idle in the stores. The AC van, a part of one sub-system, was utilised for 3909 km in two spells for four months after fabrication in May 1989.

Ministry of Mines stated in January 1994 that mainly on account of constraints of funds from the field season 1988-89 onwards the system could not be fully deployed and it was proposed to deploy the system for a deep crustal system studies programme to be conducted by GSI.

Thus, improper planning for its use resulted in idling of an equipment costing Rs 50 lakhs.

CHAPTER VII

Ministry of Non-Conventional Energy Sources

7.1 Biogas Development Programme

7.1.1 Introduction

Biogas consisting mostly of methane gas is a clear smokeless fuel and is produced through anaerobic digestion of organic materials like cattle dung, agro-wastes, water plants etc. The digested slurry is an excellent organic manure for application in agricultural field and fish ponds.

Use of biogas as an alternative fuel is being promoted through (i) construction of family type biogas plants under the National Project for Biogas Development (**NPBD**), (ii) Community/Institutional Biogas Plants (**CBP/IBP**) and (iii) Research and Development (**R&D**) by the Ministry. Biogas subsidy is provided to beneficiaries under these programmes for setting up biogas units. NPBD was started in November 1981 and CBP/IBP in 1982-83. Setting up of Nightsoil Biogas Plants (**NBP**) was included in the programmes during 1988-89. R&D activities cover micro-biology, bio-chemical engineering, development of new and cheaper designs based on multi-feedstock and use of slurry for value added products.

These programmes are implemented through State nodal departments/agencies, Khadi and Village Industries Commission (**KVIC**) and National Dairy Development Board (**NDDB**). Government of India releases funds directly to the implementing agencies. These agencies furnish monthly progress reports indicating the number of biogas plants completed during the month to the Ministry of Non-Conventional Energy Sources (**MNES**) and render adjustment accounts of the funds received.

7.1.2 Objectives

The broad objectives of NPBD are

- to provide energy in a clean and unpolluted form,
- to provide enriched manure to supplement the use of chemical fertiliser,

- to bring improvement in the life of rural women folk and children by relieving them from drudgery, and

- to improve sanitation and hygiene.

The objectives of CBP/IBP are to set up large scale biogas plants at potential sites and ensure utilisation of cow dung and alternate feedstock. NBP aims at providing benefits of biogas technology to the weaker sections of the society.

The overall objectives of biogas R&D is to reduce the cost of biogas plants and to diversify the feedstocks with a view to decreasing dependency on cow dung.

7.1.3 Scope of audit

The review covers the activities undertaken by MNES for construction of family type biogas plants (FBP) under the National Project for Biogas Development, Community/ Institutional Biogas Plants (CBP/IBP) and R&D on biogas during 1985-93. The activities of the State nodal agencies, KVIC and NDDB to the extent these are funded by the Government of India, have also been examined in 16 states and 3 union territories.

7.1.4 Highlights

- **Government of India released Rs 502.47 crores subsidy during 1985-93 for implementation of the programme through State nodal departments/agencies, KVIC and NDDB. Out of 33 states, union territories (UTs) and other agencies, there was shortfall in achievement in fourteen.**

(Para 7.1. 5)

- **A large number of biogas plants installed in some states were either not traceable or defunct for long periods or were not working successfully due to various defects/deficiencies. Prescribed percentage of physical verification was not done in 16 states and three UTs. Instructions regarding ear-marking of subsidy for setting up of biogas plants for SC/ST beneficiaries in five states were not followed.**

(Para 7.1.6)

- Andhra Pradesh and Orissa had paid subsidy of Rs 5.56 crores in advance to the implementing agencies which was contrary to the prescribed procedure. MNES had allowed subsidy at higher rates (by Rs 1.37 crores) to three states. Four states had paid irregular/ inadmissible subsidy amounting to Rs 0.59 crore to the beneficiaries.

(Para 7.1.7)

- A case of wrong selection of beneficiaries involving subsidy of Rs 0.24 crore was noticed in Punjab. Cases of plants not functioning due to non-availability of dung and water amounting to Rs 1.53 crores were noticed in the States of Andhra Pradesh, Maharashtra and Orissa. Cases of non-completion of plants to the tune of Rs 14.16 crores were noticed in the States of Andhra Pradesh, Orissa, Punjab, Rajasthan and UT of Delhi.

(Para 7.1.8)

- Adjustment accounts were not submitted to MNES by the States of Bihar and Rajasthan. Utilisation Certificates for Rs 53.62 crores were not submitted to the Ministry by the States of Bihar, Himachal Pradesh, Uttar Pradesh and West Bengal. Rs 6.41 crores were diverted for expenditure on items other than the biogas programmes in the States of Bihar, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal. Unspent balances amounting to Rs 13.96 crores remained with 12 states.

(Para 7.1.9)

- Targets for various training courses were not achieved in seven states.

(Para 7.1.10)

- R&D efforts on biogas development had limited impact on overall reduction of cost and improvement of efficiency of biogas plants.

(Para 7.1.11)

- Monitoring of the programme by the States and regional offices of MNES was inadequate. Evaluation was conducted by National Council of Applied Economic Research for the Seventh Five Year Plan. The evaluation showed that seventy five *percent* of plants were over-sized in relation to available cattle dung and/or fuel requirements, attributable to faulty appraisal and size

related subsidy amount. Sixty *percent* of plants for weaker sections were non-functional or not commissioned and percentage was higher than those for other beneficiaries. Out of 26950 plants surveyed only two third were found in working order. MNES stated that evaluation reports were sent to various implementing agencies/States from whom reply was awaited.

(Para 7.1.12)

7.1.5 Financial outlay, physical targets and achievements

Funds released by MNES and physical targets and achievements for the various States and Union Territories during the years 1985-93 have been detailed in the table below:

State-wise release of funds, targets, achievement and shortfall (1985-93):

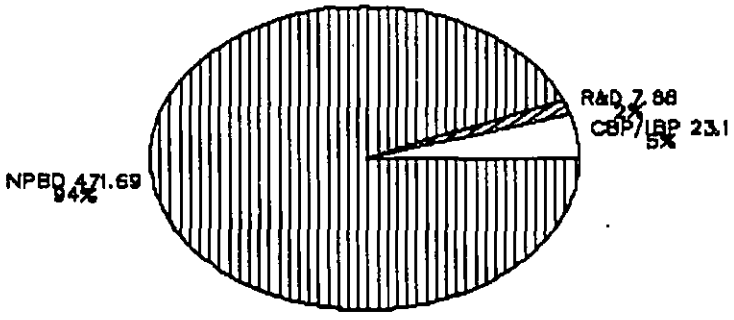
Sr. No.	Name of the State	Funds released by MNES	Targets	Achieve-ment	Short fall	Per-cent-age of short-fall
		(Rs in crores)				
1.	Andhra Pradesh	25.48	107000	89495	17505	16
2.	Arunachal Pradesh	0.02	57	88	---	---
3.	Assam	3.64	13000	8160	4840	37
4.	Bihar	8.59	40300	47287	---	---
5.	Goa	0.38	2000	1318	682	34
6.	Gujarat	44.11	116200	147010	---	---
7.	Haryana	6.26	16300	16120	180	1
8.	Himachal Pradesh	11.81	24400	27844	---	---
9.	Jammu & Kashmir	0.37	1140	811	329	29
10.	Karnataka	18.09	45500	57909	---	---
11.	Kerala	6.46	19300	19426	---	---
12.	Madhya Pradesh	9.72	26500	32150	---	---
13.	Maharashtra	126.02	234600	368112	---	---
14.	Manipur	0.30	665	637	28	4
15.	Meghalaya	0.16	515	258	257	50
16.	Mizoram	6.72	830	887	---	---
17.	Nagaland	0.03	200	64	136	68
18.	Orissa	20.72	43000	64485	---	---
19.	Punjab	5.17	14500	16307	---	---
20.	Rajasthan	10.92	28000	31697	---	---

21. Sikkim	0.39	545	997	---	---
22. Tamil Nadu	29.34	89020	107497	---	---
23. Tripura	0.06	255	239	16	6
24. Uttar Pradesh	45.79	123000	142910	---	---
25. West Bengal	15.87	48400	50950	---	---
26. Andaman Nicobar	0.02	110	105	5	5
27. Chandigarh	0.01	43	30	13	30
28. Dadar & Nagar Haveli	0.01	67	81	---	---
29. Daman & Diu	---	27	---	27	100
30. Delhi	0.06	415	426	---	---
31. Pondicherry	0.07	530	238	292	55
32. KVIC	67.03	148500	172235	---	---
33. Others	8.07	16200	13580	2620	16
	471.69	1161119	1419353	26930	
CBP/IBP	23.10	830	917		
R&D	7.68	---	---		
	502.47	1161949	1420270		

Note: State-wise release of funds and physical targets are not available for CBP/IBP and R&D projects.

Table above indicates that out of 33 states and UTs, there was shortfall in achievements by 26930 in nine states, four UTs and NDDB (others).

Budgetary Allocation In Biogas Programme



(Rs in crores)

7.1.6. Implementation of the programme

Physical verification of plants by the regional offices of MNES and the State officers revealed cases of misreporting of achievements to the extent of 28978 plants in the States of Haryana, Jammu & Kashmir, Maharashtra, Punjab, Tamil Nadu and West Bengal. Brief details of the cases are depicted below:

State-wise position of misreported achievements (1985-93)

Name of the State	No. of Plants		Variation	Remarks
	Reported	Actually Installed		
Haryana	2840	2426	414	-
Jammu & Kashmir	278	193	85	-
Maharashtra	11782 + 76*	10978	880	*76 plants allocated for construction to private agencies had not been constructed
Punjab	2009	1753	256	-
Tamil Nadu	99773	77528	22245	-
West Bengal	29651	24553	5098	-
Total	146409	117431	28978	

It was noticed during test-check that 48 CBP/IBP (62 *percent*) and 16754 FBP (69 *percent*) out of 77 CBP/IBP and 24219 FBP were not working successfully in the States of Bihar, Jammu & Kashmir, Madhya Pradesh, Maharashtra, Punjab and Tamil Nadu. Brief details of such cases are depicted below:

State-wise position of defective plants (1985-93):

Name of State	No of defective plants		
	CBP/IBP	FBP	Total
Bihar	-	1845	1845
Jammu & Kashmir	-	297	297
Madhya Pradesh	29	-	29
Maharashtra	-	7860	7860
Punjab	9	-	9
Tamil Nadu	10	6752	6762
	48	16754	16802

MNES stated in November 1993 that (i) a scheme for providing financial support for repair of old non-functional CBP/IBP/NBP has also been launched from the year 1993-94 for improving the functionality of these plants and that (ii) the response of the State Governments in respect of these cases had not been received.

Physical verification

As envisaged in the letter conveying administrative approval of MNES regarding implementation of NPBD during the year 1989-90, the implementing agencies were to ensure that incomplete/uncommissioned plants might not be included for monthly reporting and claiming subsidy and targets fixed for physical verification of biogas plants at different levels. Block level officer, District level officer and State level officer were required to physically verify the biogas plants to the extent of 100 *percent*, 5-10 *percent* and 1-5 *percent* respectively. It was observed that the prescribed percentage of physical verification at Block, District and State level had not been done in 16 states and three UTs. In Himachal Pradesh, no physical verification had been done and in West Bengal, records of physical verification were not made available to Audit.

Partial physical verification was done in the States of Andhra Pradesh, Madhya Pradesh, Orissa, Punjab and Tamil Nadu. Out of 309934 plants installed, 45342 plants were physically verified and 264592 plants remained unverified. The State-wise position (1985-93) is as under:

Name of State	Number of Plants installed	Number of Plants verified	Percentage verification
Andhra Pradesh	89495	10835	12.1
Madhya Pradesh	32150	5955	18.5
Orissa	64485	16676	25.8
Punjab	16307	1645	10.0
Tamil Nadu	107497	10231	9.5
	309934	45342	

MNES stated in November 1993 that the States had not so far responded to these observations.

Provision for SC/ST beneficiaries

As per administrative approval for implementation of NPBD during 1985-86, 10 to 15 *percent* of the funds released towards subsidy should be earmarked for setting up biogas plants for beneficiaries belonging to SC/ST. This provision was raised to 25 *percent* from the year 1989-90. It was observed during test-check of records of the under-mentioned States/UTs that the above instructions were not adhered to by the implementing agencies at the time of release of subsidy as shown below:

State/UT	Years	Percentage of subsidy utilised for SC/ST
Kerala	1985-93	0.44 to 4.77
Maharashtra	1989-93	12 to 20
Punjab	1987-93	3 to 8
Tamil Nadu	1989-90	6
West Bengal	1989-93	14

While accepting the fact, MNES stated in November 1993 that the beneficiaries belonging to SC/ST categories could not avail of the required facilities due to poverty and lack of resources.

7.1.7 Irregular release of subsidy

Advance subsidy

In terms of MNES instructions regarding implementation of NPBD during 1989-90, Central subsidy should be paid to the beneficiaries only after completion of the plants in all respects including gas distribution pipe line, burner etc. Under no circumstances was Central subsidy to be paid in advance to the beneficiaries before construction of biogas plants. It was observed that the instructions of MNES were not adhered to by the implementing agencies in the States.

Cases of advance release of subsidy amounting to Rs 1.25 crores and Rs 4.31 crores relating to the States of Andhra Pradesh and Orissa respectively were noticed in audit.

MNES stated in November 1993 that the concerned States have been asked to clarify the position.

Subsidy at higher rates

Cases of payment of subsidy at rates higher than admissible which resulted in excess payment amounting to Rs 1.37 crores were noticed in MNES and in the States of Assam, Haryana and Punjab as per details given below:

i) During scrutiny of records relating to release of advance subsidy for the year 1991-92, it was observed that MNES had made payments of advance subsidy at the rate of Rs 3000 per plant instead of the approved rate of Rs 2600 which resulted in excess payment of Rs 0.99 crore. No action for recovery of excess payment had been initiated by MNES.

MNES stated in November 1993 that Commission for Additional Sources of Energy (CASE) had approved a revised rate of Rs 3000. This approval was not minuted as observed in Audit.

ii) In Assam, against admissible subsidy of Rs 2.66 crores for installation of 4925 biogas plants of different sizes, the District Rural Development Agencies (DRDAs) released subsidy amounting to Rs 2.99 crores to the banks resulting in excess release of Rs 0.33 crore. No action had been taken by the DRDAs to recover the excess amount.

MNES stated in November 1993 that the Government of Assam has been requested to clarify the position.

iii) In Haryana, in 531 cases of biogas plants of sizes three to six cu m were installed during 1985-93 for family members ranging from 2 to 12 and having cattle heads from one to nine whereas the biogas plants in the range of one to four cu m would have served the purpose. Installation of plants of higher capacity involved excess payment of subsidy of Rs 0.04 crore.

MNES stated in November 1993 that Haryana Government had not submitted the claims for the year 1991-92 whereas the claims of earlier years were adjusted and recovery for excess payment was made. The contention of MNES does not seem to be correct as the excess payment of Rs 4 lakhs involved cases of earlier years for which the claims had been settled.

iv) In Punjab, excess subsidy of Rs 2 lakhs was paid to 415 beneficiaries in four districts during September 1990 to May 1991 although the rate of subsidy payable for six cu m biogas plants was reduced by Government of India from Rs 2610 to Rs 2200 in August 1990.

MNES stated in November 1993 that Rs 3600 had been deducted from the claims of Government of Punjab in the year 1991-92. In audit, an excess payment of Rs 0.02 crore had been pointed out on account of delayed compliance to orders of August 1990.

Installed capacity higher than required

In Punjab, test-check of 96 CBPs sanctioned by MNES during 1985-93 revealed that the installed capacity of these plants of 15660 cu m was apportioned among 6959 connections which worked out to 2.25 cu m per unit. The number of connections actually required were 4340 which utilised only 9765 cu m. The surplus capacity of 5895 cu m resulted in wasteful investment of Rs 1.85 crores (@ Rs 3140 per cu m).

MNES stated in November 1993 that bigger capacity plants, though under-utilised currently, could handle future expansion of gas requirements arising out of increased human or cattle population. However, the fact remains that plants of capacity higher than needed were installed.

Irregular/inadmissible subsidy

Cases of inadmissible release of subsidy/payment amounting to Rs 0.59 crore were noticed in the States of Assam, Himachal Pradesh, Maharashtra and Orissa. Details of such cases are shown below:

State-wise position of inadmissible subsidy (1985-93)

Name of State	Year(s)	Amount
		(Rs in crores)
Assam	1987-92	0.04
Himachal Pradesh	1985-91	0.44
Maharashtra	Not available	0.03
Orissa	1990-92	0.08
Total		0.59

MNES stated in November 1993 that the response from State Governments of Assam, Himachal Pradesh and Maharashtra was still awaited. In the case of Orissa, MNES admitted that warranty clause of two years had not been enforced by the implementing agency.

7.1.8 Infructuous expenditure

(i) In Punjab, eleven projects (CBP-9,IBP-2) sanctioned by MNES during December 1986 to March 1991 for which Rs 0.24 crore were released, were not completed upto February 1993 by the nodal agency due to wrong selection of beneficiaries. The nodal agency requested MNES to cancel nine projects and transfer two projects falling in Jammu & Kashmir to that State. Nine projects were cancelled and two projects were transferred to Jammu and Kashmir as of October 1993. Action of the Government in approving the plants was not judicious as it had resulted in idle investment. No intimation regarding recovery of Rs 0.24 crore was given by MNES.

(ii) Cases of 57 plants not functioning due to non-availability of dung and water amounting to Rs 1.53 crores were noticed in the States of Andhra Pradesh, Maharashtra and Orissa. Details of these cases are depicted below:

Name of State	No. of plants	Amount
		(Rs in crores)
Andhra Pradesh	19	0.46
Maharashtra	32	1.01
Orissa	6	0.06
Total	57	1.53

MNES stated in November 1993 that information was awaited from State Governments.

(iii) A case of construction of a community biogas plant and some family biogas plants for the same beneficiaries was noticed in Maharashtra resulting in infructuous expenditure of Rs 0.04 crore.

MNES stated in November 1993 that information was awaited from the Maharashtra Government.

(iv) Cases of non-completion of plants by the original contractors which involved excess payment of Rs 0.07 crore were noticed in the States of Delhi (National Zoological Park) and Punjab. The details of such cases are as under:

a) National Zoological Park **(NZP)**, New Delhi in consultation with MNES proposed in January 1987 installation of a biogas plant in its premises from animal droppings. Accordingly, MNES sanctioned an amount of Rs 0.02 crore and released Rs 75000 for construction of the plant within 12 months from the date of sanction. The work was awarded to a contractor for Rs 0.02 crore. Though payment of Rs 0.01 crore was released, the work was not completed.

b) In Punjab, in 11 cases, the contractors failed to construct the biogas plants within the stipulated period and the works were completed through other contractors at their risk and cost. The nodal agency did not take any action to recover the amount of Rs 0.05 crore from the contractors on account of penalty (Rs 0.04 crore and risk and cost Rs 0.01 crore).

MNES stated in November 1993 that the plant at NZP New Delhi had been completed but not commissioned. As regards others, information was awaited from the State Government.

(v) Cases of non-completion of plants and blocking of funds to the tune of Rs 14.16 crores were noticed in the States of Andhra Pradesh, Orissa, Punjab, Rajasthan and Delhi UT. The details of these cases are as under:

(a) In Andhra Pradesh, a State PSU followed the system of disbursing 95 *percent* of the subsidy in advance for plants constructed during 1990-91 and 1991-92 and 85 *percent* for plants constructed during 1992-93 at the installation stage i.e. on completion of civil works, supply of equipment etc. but before commissioning of the plants. The balance subsidy was being released after commissioning of the plants i.e. after feeding the dung. It was observed by the State PSU that 900 plants constructed during 1990-91 and 1991-92 involving a subsidy of Rs 0.22 crore had remained uncommissioned as of May 1993 and as such the investment became idle.

(b) In Orissa, out of 20 CBP/IBP/NBP constructed at different places during 1985-93, seven biogas plants costing Rs 0.14 crore were not working.

(c) In Punjab, out of 151 CBP/IBP projects sanctioned by MNES, only 35 projects were completed within the stipulated period, 113 projects were delayed for two to 83 months and three plants could not be commissioned.

(d) In Rajasthan, according to the enquiry report of the Project Director DRDA, Udaipur, one Panchayat Extension Officer **(PEO)** was advanced Rs 0.17 crore in cash during June-September 1985 for construction of biogas plants. The PEO rendered the account for Rs 0.15 crore and did not refund the unutilised balance of Rs 0.02 crore. Out of the total purchase of equipment like burners and rubber pipe costing Rs 0.01 crore, items worth Rs 0.01 crore were lying unused since May 1991. Non-adherence to the instructions of Government of India regarding payment of subsidy after completion of plants in all respects resulted in unproductive expenditure of Rs 0.08 crore. In five districts, subsidy amounting to Rs 0.15 crore paid to 616 beneficiaries had gone waste due to the absence of timely repairs and effective follow up by the State Government.

(e) In Delhi, Delhi Energy Development Agency (DEDA) placed an order on BHEL, Hyderabad in March 1986 for supply of five 5 KW biogas operating generating sets complete in all respects and commissioned at the rate of Rs 50000 per set inclusive of all taxes, cost of transportation etc. One set was to be supplied immediately and remaining four sets were to be supplied within two months from the date of issue of supply order. One DG set was supplied in March 1986 but it did not work. Remaining four sets were supplied in March 1987 without approval of the competent authority for the extended period. These sets were not installed/ commissioned till April 1993 but payment of Rs 0.02 crore being 90 *percent* of the total payment was released to BHEL in March 1988 and the balance of Rs 25000 was withheld by DEDA. This resulted in blocking of funds to the extent of Rs 0.02 crore.

MNES stated in November 1993 that the information from the respective State Governments was still awaited.

(vi) During scrutiny of release cases in MNES for the years 1985-86 to 1987-88 it was observed that the payment of service charges had been made by adopting a flat rate of Rs 7000 per plant instead of taking into account the average unit cost of biogas plants actually installed (total cost of construction of plants divided by number actually installed in a financial year). Release of service charges at the flat rate of Rs 7000 per plant instead of actual average unit cost had resulted in excess payment to the State implementing agencies. MNES was requested to intimate the basis of adoption of flat rate of Rs 7000 per plant and also the number of plants in each year for which payment was made at this rate.

MNES stated in November 1993 that unit cost fixed at Rs 7000 per plant was used only for the purpose of release of advance service charges and final adjustment was done on the basis of actual cost of plants of different capacities. The reply is not tenable since there is no provision for making advance payment of service charges nor were details of adjustment of final cost furnished to Audit.

(vii) A case of wrong accounting of cement and steel amounting to Rs 0.11 crore was noticed in Andhra Pradesh. Steel was issued to the fabricators of biogas plants on

adhoc basis without ascertaining the actual requirements. Steel valuing Rs 0.11 crore (76-45 tonnes) issued to four fabricators during May-June 1991 remained unutilised with them and as such the expenditure of Rs 0.11 crore became unfruitful.

MNES stated in November 1993 that the information from the State Government was still awaited.

7.1.9 Accounting irregularities

Non-rendition of adjustment accounts

Cases of non-rendition of adjustment accounts amounting to Rs 1.37 crores were noticed in MNES and the States of Bihar and Rajasthan. The details of such cases are as under:

Name of State/ Ministry	Amount released	Years	Remarks
	(Rs in crores)		
MNES	1.31	1985-92	National level awards
Bihar	0.04	1991-92	Cement suppliers
Rajasthan	0.02	-	Payment to biogas mistries
	1.37		

MNES stated in November 1993 that the matter was being taken up with the State Governments.

Outstanding utilisation certificates

Cases of outstanding utilisation certificates in respect of releases to the tune of Rs 53.62 crores were noticed in the States of Bihar, Himachal Pradesh, Uttar Pradesh and West Bengal.

MNES stated in November 1993 that the matter regarding submission of outstanding utilisation certificates had been taken up with the concerned State Governments.

Diversion of funds

Cases of diversion of funds amounting to Rs 6.41 crores were noticed in the States of Bihar, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal. The details of such cases are tabulated below:

Name of State	Amount	Purpose of Diversion
	(Rs in crores)	
Bihar	0.30	Other heads of expenditure.
Maharashtra	0.64	Construction of new building and purchase of furniture.
Orissa	1.65	Kept in civil deposits.
Tamil Nadu	0.31	For expenditure on Integrated Rural Development Programme and credit to State Government for repair of plants.
Uttar Pradesh	0.01	-
West Bengal	3.50	Transferred to State Government Undertakings and hire of vehicles, purchase of furniture.
Total	6.41	

MNES stated in November 1993 that the audit observations have been sent to the various State Governments and their response in this respect was still awaited.

Unspent balance

Cases of unspent balance amounting to Rs 13.96 crores were noticed in the States of Andhra Pradesh, Bihar, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. Brief details of the cases are depicted below:

Sl No	Name of State	Amount Received	Amount utilised/ refunded	Unspent balance as on 31 March 1993
		(Rs in crores)		
(i)	Andhra Pradesh	1.61	1.51	0.10
(ii)	Bihar	4.85	0.30	4.55
(iii)	Himachal Pradesh	0.08	-	0.08
(iv)	Karnataka	0.03	0.01	0.02
(v)	Madhya Pradesh	0.83	-	0.83
(vi)	Maharashtra	0.40	-	0.40
(vii)	Orissa	4.47	3.01	1.46
(viii)	Punjab	14.65	13.89	0.76
(ix)	Rajasthan	1.12	1.03	0.09
(x)	Tamil Nadu	2.19	1.56	0.63
(xi)	Uttar Pradesh	4.40	0.37	4.03
(xii)	West Bengal	1.06	0.05	1.01
Total		35.69	21.73	13.96

MNES stated in November 1993 that the information on the observations was yet to be received from the State Governments.

Other irregularities

Cases of irregularities of different nature were also noticed in the States of Assam, Bihar and West Bengal, which are detailed below:

i) In Assam, one demand draft drawn in August 1990 for Rs 0.02 crore was found missing, but no action had been taken to trace it as of June 1993.

ii) In Bihar, a bank draft for Rs 0.02 crore was issued by Bihar Renewable Energy Development Agency in favour of Deputy Development Commissioner, Ranchi in March 1992 which had not been received by the drawee. Confirmation of encashment was awaited (May 1993). The amount remitted for implementation of biogas programme, remained out of account for more than one year.

iii) In West Bengal, total expenditure of Rs 15.22 crores was stated to have been incurred between 1985-86 and 1992-93 by the State Government whereas the expenditure booked in accounts was Rs 16.68 crores. The difference of Rs 1.46 crores was not reconciled by the State Government as of October 1993.

MNES stated in November 1993 that the information was awaited from the respective State Governments.

7.1.10 Training

In the letter conveying administrative approval of MNES regarding implementation of NPBD during 1991-92, it was stated that MNES had established 13 Regional Biogas Centres for providing training and technical back-up for effective and accelerated implementation of NPBD. It was emphasized that the State Governments/Implementing Agencies may make best use of facilities developed at these Centres for the purpose of organisation of training courses, maintenance/ repair of biogas plants, extension/developing publicity material in regional languages etc. It was observed during test-check of records of the implementing agencies in the States that there was shortfall in the achievement of targets fixed for the various states. Brief details of such cases are tabulated below:

State-wise position of Training Courses Conducted (1985-93)

Name of State	Year	Targets	Achieve-ment	Short-fall	Remarks
Andhra Pradesh	1985-93	2244	996	1248	Shortfall was due to delay in communication of targets, release of funds.
Himachal Pradesh	1985-93	675	413	262	Reasons were not available.

Karnataka	1985-93	3631	1132	2499	Shortfall was due to non-participation of invitees of te other Institutions and trainee officers.
Orissa	1989-93	911	556	355	Shortfall was due to delay in issue of administrative approval from MNES.
Tamil Nadu	1985-93	3690	3058	632	Not available
Uttar Pradesh	1989-90	200	119	81	Shortfall due to late receipt of funds, delayed selection of trainees and inadequacy of staff.
West Bengal	1985-93	3711	1727	1984	Not available
Total		15062	8001	7061	

MNES stated in November 1993 that the main problem contributing to non-achievement of targets was the lack of coordination between the training centre and implementing agencies.

7.1.11 Research and Development on Biogas

R&D programme is being implemented by Biogas Division and Bio-Energy Division. The broad objectives of the R&D programme under Waste Recycling and Resource Recovery Systems are to develop cost effective processes and set up pilot plants for generation of biogas and recovery of other resources from a variety of biodegradable wastes for use at village, urban and industrial levels.

Out of 59 projects completed during the period 1985-93, 24 project files were test-checked which revealed the following:

(a) In five cases, the final project reports had not been received though periods ranging from 15 months to 48 months had already expired.

(b) In five cases, the final reports had been received but had not been evaluated.

MNES stated in November 1993 that the final report received from principal investigator (PI) had been evaluated within the Biogas Division itself. The fact remains that the final reports were not evaluated by a committee of experts.

(c) In one project, out of the eight equipments sanctioned only three were procured.

MNES stated in November 1993 that the project had been completed successfully. The work was completed with three equipments instead of eight sanctioned which indicated that equipment required for the project were not assessed properly.

From the above, it was clear that the R&D programme in NPBD was not effectively taken up. Even in the Eighth Plan document submitted by MNES to Planning Commission it had been mentioned that R&D in Biogas programme had been aimed mainly at diversification of feedstocks and development of alternative and low-cost construction material for biogas plants. R&D efforts, however, had limited impact in the overall reduction of cost and improvement of efficiency of biogas plants.

Non-installation of new models

New and cheaper models of biogas plants like Chetak, Capsule-shaped and Govardhan were developed and emphasis laid on their popularisation and acceptance. Further, the total expenditure incurred by MNES for developing these models had not been furnished by the Ministry.

MNES stated in November 1993 that these plants had been developed more or less at the same time as the Deenbandhu biogas plants. Since they did not match the combination of high strength and low-cost of Deenbandhu biogas plant, the new design plants were not pursued further. Expenditure incurred on development of these modules (Chetak, Capsule-shaped and Govardhan) had proved infructuous.

7.1.12 Monitoring and evaluation

A three-tier monitoring and evaluation system had been prescribed. The first tier was the inspection reports submitted by the State Governments and agencies on quarterly basis. The second tier was direct monitoring through their regional offices. The third tier included evaluation survey study by independent agency.

During scrutiny of files for 1985-93 in MNES, it was noticed that quarterly reports were not received regularly from the State implementing agencies. The receipt of these reports was not watched by MNES. The regional offices also could not undertake direct monitoring of the biogas plants in respect of the plants set up by the various State implementing agencies.

MNES stated in November 1993 that quarterly progress reports were submitted regularly at least by the major States. It was thus clear that the quarterly reports were not received from all the states, as required.

Evaluation

Implementation of NPBD during the Seventh Plan period was evaluated by National Council of Applied Economic Research (NCAER), New Delhi who submitted the final report in November 1992. The evaluation survey covered 20 states/UTs, 281 districts, 1527 blocks/mandals, 3601 villages, 29662 households (owning plants 26952 and non-owning plants 2710).

The main findings and recommendations of the evaluation committee were as under:

i) About three *percent* of the households did not have any cattle at the time of interview. Most of them did not have any cattle even at the time of installation of the plant. Households with no cattle was significantly higher in the States of Delhi, Tamil Nadu, Maharashtra, Mizoram and Kerala. Implementing agencies did not verify this aspect while sanctioning biogas plants.

ii) About seventy five *percent* of the plants were over-sized for available inputs (cattle dung) or beneficiary requirements of fuel. Also during the Seventh Plan period 2.50 lakh biogas plants of more than 4 cu m size were set up which had not been operated to their full capacity.

iii) Sixty *percent* of plants for SC/ST categories were non-functional or un-commissioned and higher than those for general category beneficiaries.

iv) Out of 26950 plants surveyed only two-thirds were found in working order which included six *percent* plants that worked only partially. Over seven *percent* of plants were found to be incomplete while about five *percent* were complete but not commissioned till the date of survey. Another two *percent* plants were found in dismantled/ abandoned condition.

v) Staff manning both managerial and clerical level of the implementing agencies was largely non-technical. Functional staff at field level was found to be inadequate.

vi) Out of 5000 new masons trained every year hardly half were available for this activity, while the remaining sought employment elsewhere. While only construction of new plants was taken on priority on a large scale over years, repair and maintenance activity had taken a back seat resulting in addition of non-functional plants year after year.

vii) Implementing agencies had focussed no attention on the post installation care and revival of closed plants.

MNES stated in November 1993 that the final evaluation report of NCAER was circulated in December 1992 requesting the implementing agencies to review the implementation of

NPBD in the states. The action by implementing agencies was yet to be intimated (January 1994).

7.2 Undue benefit to a private firm

Two State nodal agencies had awarded the work of setting up of solar water heating systems to firm 'J' in states. To carry out this work, firm 'J' placed an import order for 3000 sheets of solar float glass and applied for authorisation, to the Ministry of Non-Conventional Energy Sources (MNES) in December 1988 to open a letter of credit on behalf of the Solar Energy Centre (SEC) of the Ministry for duty free import of the same as better quality glass would improve efficiency of solar water heating systems. MNES authorised firm 'J' in December 1988 to open the LC on behalf of SEC.

This work, however, did not form part of R&D under solar water heating programme. MNES obtained NMIC and duty exemption for 3000 sheets of float glass in favour of firm 'J' although in its proposal it had already decided to retain only two sheets for SEC and give one to another firm for R&D for improvement of glass quality. Balance quantity of 2997 sheets was to be utilised by firm 'J' for installing the solar water heating systems in the states.

MNES had got the consignee changed to SEC to get the consignment cleared by the Customs in November 1989 on the assurance given by MNES that it would be used for R&D and proof of this fact would be sent to Customs within fifteen days. The consignment after clearance was taken directly by firm 'J'. No communication was sent by MNES to Customs indicating proof of R&D usage of the imported glass. MNES applied for partial exemption of duty in November 1989 to the Department of Revenue indicating the circumstances, but this was rejected in December 1989 as firm 'J' was involved in commercial activity.

According to firm 'J' statement in September 1989 it had used only 414 sheets in August 1989 against the supply of 2970 sheets. Thirty sheets had been given to three glass manufacturers by MNES for evaluating the composition of the material being used abroad for float glass. Utilisation of balance quantity of 2556 sheets by firm 'J' in installation of solar water heating system had not been ascertained by MNES.

Thus, as a result of irregular certification by MNES undue benefit of Rs 14.26 lakhs on account of 100 *percent* duty exemption had been given to firm 'J'.

MNES stated in November 1993, that some officials of the SEC/Ministry had misrepresented the case to extend help to the firm to enable it to avail of customs duty exemptions and this matter was being investigated by the Central Bureau of Investigation (CBI).

CHAPTER VIII

Ministry of Planning

(Planning Commission)

National Informatics Centre

8.1 Materials Management

8.1.1 Introduction

National Informatics Centre (NIC) was set up in 1977 as an apex body, under the Department of Electronics, to provide information services to various Ministries and Departments. The services include setting up of information/computer Centres, conducting feasibility studies, design and development of management information systems including complete hardware/software support and are called 'informatics'. In March 1988, NIC was transferred from the Department of Electronics to the Planning Commission.

8.1.2 Scope of audit

Records relating to purchases, issues and disposals made by NIC during the years 1986-93 were test-checked in audit. Out of thirty two, eleven Regional/State Informatics Centres were also selected for examination.

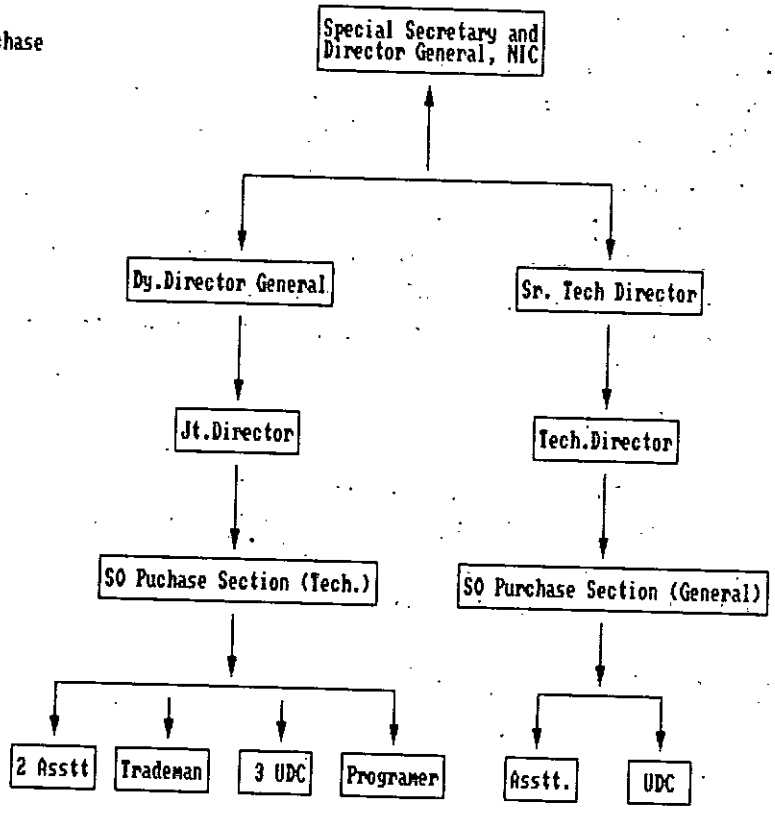
8.1.3 Organisational set up

Background

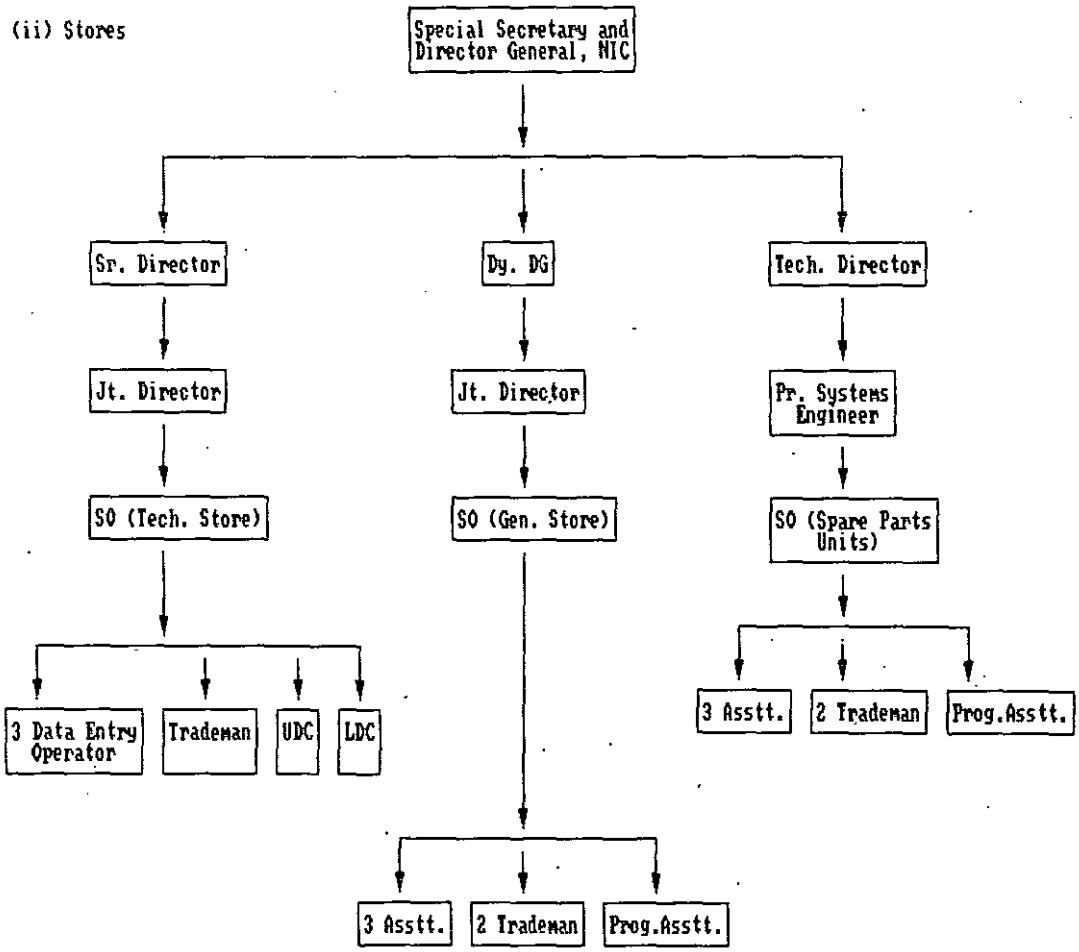
To provide the informatics services nation-wide, NIC has set up a satellite based computer and communication network 'NICNET' covering 60 Central Government Departments, 32 State Governments/Union Territories and 450 Districts. NIC signed a memorandum of understanding with all the States/Union Territories effective 1985-86. Materials management covers acquisition of stores, their storage and custody, distribution and disposal. Procurement of stores and equipment is mainly done by NIC headquarters. The Regional Centres of NIC have also been delegated powers to incur expenditure upto Rs 1 lakh on purchase of appliances, execution of civil works/electrical fittings.

The charts below depict distribution of work as well as quantum of staff deployed in NIC on materials management.

(i) Purchase



(ii) Stores



8.1.4 Highlights

- There was no system for methodical recording, monitoring and consolidating expenditure on procurement of consumable and non-consumable stores.

  Penalty for delay in supply of stores was waived resulting in a loss of Rs 11.13 lakhs in two cases noticed by Audit.

  (Para 8.1.6)

- Stores worth Rs 19.11 lakhs in respect of three cases were received in defective/mismatched/damaged condition. Replacements/recoveries for the damaged stores was awaited.

Due to improper planning and monitoring, equipment worth Rs 3.67 crores remained uninstalled/unutilsed for a period ranging between 18 to 39 months.

As against the cost of procurement of distribution rights of a software of Rs 1.07 crores, which was to be fully shared amongst the six prime users, NIC could recover only Rs 98.79 lakhs. The expected revenue on account of consultancy, maintenance and sale of software also did not materialise.

Items worth Rs 1.15 crores were lying in stores without use for periods ranging from one to four years.

In four cases, customs duty amounting to Rs 52.13 lakhs had been overpaid, claims for refunds of which had either not been lodged or were still pending.

(Para 8.1.7)

- Physical verification of stores at NIC headquarters and seven State/Regional Informatics Centres was not carried out regularly. The discrepancies of stores issued from NIC and those accounted for by the State Informatics Centres were not reconciled.

(Para 8.1.8)

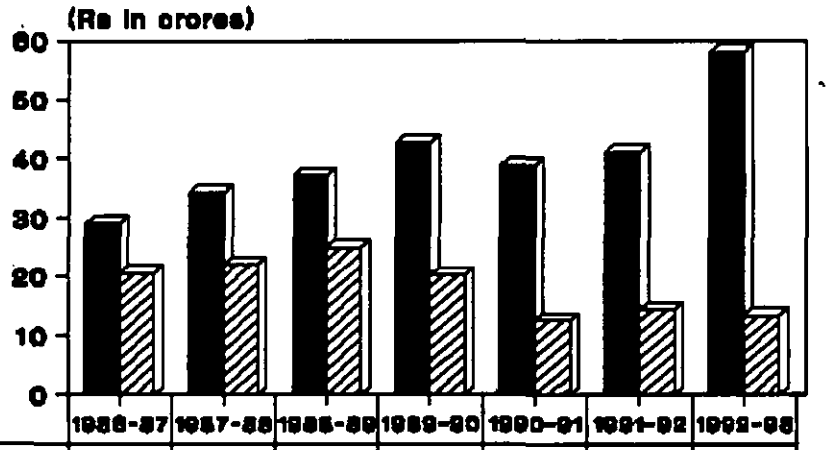
- Due to delay in taking a decision for timely surrender of lease rights on use of Intelsat, overlap payment was made for hiring the transponder during December 1990 to May 1991 involving excess payment of Rs 49.61 lakhs.

(Para 8.1.9)

8.1.5 Financial outlay on materials

Expenditure on procurement and capital stores during the period 1986-93 is shown below:

Expenditure On Stores Purchased By NIC 1986-1993



	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93
Total Expenditure	29.07	34.83	37.34	42.8	38.86	41.13	58.18
Expn. on Cap.Store	20.64	22.07	25.05	20.3	12.56	14.47	13.4

Total Expenditure Expn. on Cap.Store

8.1.6 Purchase

System

NIC did not have a system for methodical recording, monitoring and consolidating expenditure on procurement of consumable and non-consumable stores. NIC is exempted from making purchases through Directorate General of Supplies and Disposals (DGS&D). On receipt of an indent from the indenter, the Purchase section decides the mode of purchase, viz. single or limited or open tender or repeat order. NIC follows the provisions of General Financial Rules (GFRs) but in emergent cases purchases exceeding Rs 50000 are also made by limited tenders. The offers received against the invitation of tenders are scrutinised by a Technical Evaluation Committee (TEC) constituted on case-to-case basis and orders are placed on the recommendations of TEC. Imported stores are purchased on single tender basis after verification of availability and reliability.

Out of the total expenditure of Rs 152.28 crores on procurement of stores during 1986-93, 1051 purchase cases valuing Rs 82.62 crores were test-checked.

Losses due to defective procedure

(i) Purchase orders for supply of 155 and 139 Super A/T computers at Rs 2.29 lakhs each were placed on firm 'K' and firm 'L' respectively in January 1988. These were to be supplied by end of February 1988. By May 1988, firm 'K' delivered 151 Super ATs whereas firm 'L' could supply only 17. Delivery for the remaining systems was made in instalments during June 1988 to January 1989. The committee constituted by NIC for considering levy of penalty for delay in supplies recommended (February 1989) that penalty need not be levied as there was overall world-wide shortage of 'DRAM' memory chips. Non-levy of penalty on firm 'L' for the delay in supplies beyond May 1988 was not justified on these grounds as firm 'K' had almost completed the supplies by May 1988 despite the alleged shortage of memory chips. The penalty recoverable from firm 'L' worked out to Rs 9.78 lakhs.

NIC stated in January 1994 that DRAM shortage was world-wide and different sources of supply had different prices and lead times of delivery depending upon their sourcing strategies. The reply of NIC is not acceptable as non-levy of penalty beyond May 1988 on these grounds, tantamounts to giving of undue benefit to firm 'L'.

(ii) NIC placed a purchase order on firm 'M' in January 1991 for supply, testing and installation of 300 VT-100 compatible multilingual terminals alongwith cables at Rs 9550 each. The stores were to be supplied within six weeks from the date of placing of order failing which penalty was leviable at five *percent* for the seventh week and at ten *percent* thereafter. On a request from the supplier, NIC extended in January 1991 the delivery period upto eight weeks from the date of placing order keeping the penalty clause intact. The firm 'M' delivered 141 terminals during June 1991 after more than four months from the date of placing the order for which NIC ought to have recovered Rs 1.35 lakhs as penalty.

NIC stated in January 1994 that as this was a new technology, there was shortage of chips and circumstances were beyond the control of the vendor, it was decided not to recover the penalty. It was, however, seen that the chips were actually made available before 5th March 1991.

(iii) In four cases, NIC had either not properly enforced the risk purchase clause or not incorporated this clause in the contract with the result that it could not recover the extra expenditure of Rs 2.61 lakhs incurred on account of purchases of stores at higher rates from alternate sources after the original contractors had defaulted.

NIC stated in January 1994 that it had experienced the market trend that the small vendors supplied the stores to other customers, if there was any delay by NIC in finalisation of the tenders due to government tendering procedure and inclusion of the risk purchase clause in such cases might lead to non-receipt of offers as the parties would shy away. The reply furnished by NIC is not convincing.

8.1.7 Stores

Defective/Incomplete equipment

(i) NIC placed a purchase order on a foreign firm in December 1989 for supply of spares for a system at Rs 12.62 lakhs. The stores shipped by the firm during September 1990 was cleared by NIC on payment of customs duty of Rs 13.54 lakhs. The stores were inspected during December 1990 and were accounted for in the stock ledgers of NIC, without bringing out any discrepancies between the stores ordered and those received. However, on being pointed out by the foreign firm in July 1991 that they had incorrectly sent the particular spare parts, NIC requested the firm in August 1991 to replace the items free of cost. The cost of the ICF - short sensor worked out to Rs 4.14 lakhs (Rs 2.01 lakhs cost *plus* Rs 2.13 lakhs customs duty). NIC had not received the replacement till July 1993. NIC has accepted the facts (January 1994).

(ii) Purchase order for supply of spares for micro-earth stations valuing Rs 75.30 lakhs was placed on a foreign firm in March 1992. The spares which arrived at New Delhi airport in January 1993 were cleared paying Rs 101.55 lakhs customs duty. The technical expert committee, which carried out the inspection of the stores in March 1993, brought out that six items valuing Rs 5.79 lakhs were faulty/mismatched. The foreign firm agreed in May 1993 to replace the spare parts but NIC was yet to receive the replacements (January 1994).

The cost of the spares worked out to Rs 13.17 lakhs (Rs 5.79 lakhs cost *plus* Rs 7.38 lakhs customs duty). NIC has accepted the facts (January 1994).

(iii) NIC placed two purchase orders in September 1990 and November 1990 on a Public sector undertaking (PSU) for supply of 20 'EGA' colour monitors valuing Rs 3.64 lakhs plus sales tax. On completion of supply by the PSU, NIC released 90 *percent* payment in January and February 1991. During inspection of stores in March 1991, 10 monitors were found to be faulty. As the PSU could not rectify the problems despite repeated requests, NIC decided in May 1991 to recover the 90 *percent* payment amounting to Rs 1.80 lakhs plus penal interest at the rate of 18 *percent* from the date of payment of advance till the date of refund. The amount had still not been refunded as of January 1994. NIC has accepted (January 1994) the facts and stated that necessary recovery would be made from the pending bills of the firm.

(iv) NIC placed an order in May 1990 on an Ahmedabad based firm for supply of 59 air-conditioners along with stabilizers at Rs 24535 (*plus* sales tax at 4 *percent*) each, to be supplied at five State Informatics Centres including 26 air-conditioners with stabilizers to the Bihar State Informatics Centre, Patna. NIC made payments of Rs 14.75 lakhs (Rs 13.00 lakhs in July 1990 and Rs 1.75 lakhs in August 1990) on account of 98 *percent* of the cost of the air-conditioners, on the basis of proof of despatch submitted by the firm. It was noticed that the air-conditioners despatched to Sahibganj, Gumla and Godda districts of Bihar had not been received by the consignees. NIC, reported the matter to DGS&D (who had finalised the rate contract) and also lodged a complaint with the police authorities in September 1993. In reply, it was stated in January 1994 that NIC was consistently following up the subject till delivery of the three air-conditioners.

Non-installation leading to idling of investment

(i) NIC issues 'dumb' terminals, micro-earth stations, computer systems, air-conditioners, etc. to State/District Informatics offices. Besides, such stores were also delivered direct by the vendors to the District Informatics offices. NIC had not developed any mechanism to monitor/watch the extent of utilisation of these equipment at the District Informatics Centres or the causes for non-

utilisation/non-commissioning such as want of man-power, power supply, non-completion of works or other reasons. NIC was also not maintaining any log books for the equipment.

During test-check of records, it came to notice that in the following cases, involving Rs 366.75 lakhs, the delay in installation of equipment ranged between 21 months to 39 months:

Name of the equipment	Qty	Cost (Rs in lakhs)	Extent of delay in commissioning/ installation	Reason for delay
ND 550 (Bhopal)	1	51.31	18 months	Attributable to the fact that the State Govern-ments who had conveyed their firm require-ments during 1985-86, could not make avail-able technically acceptable sites in time.
ND 550 systems (Gandhi Nagar, Delhi, Bombay, Madras, Calcutta, Shillong)	6	306.72	22 to 39 months	-do-
Multitech modems (Lucknow)	108	8.72	20 months	The modems remained uninstalled for want of telephone connections to be provided by District Rural Development Authority.

(ii) Based on an offer from a foreign firm, NIC initiated in August 1986 a proposal for one time purchase of a 'Z' software at Rs 108.37 lakhs. The cost was proposed to be shared amongst six prime users of the software viz. the erstwhile Oil and Natural Gas Commission (ONGC), Engineers India Limited, Bhabha Atomic Research Centre, Bharat Heavy Electricals Limited, Research Designs and Standards Organisation and NIC of which NIC's share was Rs 20 lakhs. NIC also proposed to sell the software to secondary users (since the firm had offered to NIC to sell unlimited copies of the software) and to take up maintenance and consultancy services for the systems to be installed at primary units and hoped to generate revenues of Rs 161.90 lakhs from these services.

During May 1987 NIC decided to make the entire payment to the foreign firm and collect the money from the primary users upon their acquiring the systems on which the software was to run. NIC entered into a contract with the firm in January 1988 for five years and made a total payment of Rs 106.52 lakhs (Rs 52.53 lakhs in March 1988 and Rs 53.99 lakhs in November 1988) without entering into any agreement or understanding with the primary users for sharing the cost of the 'Z' software and also for follow up maintenance and consultancy services by NIC.

NIC could not collect the shares payable by the primary users except from ONGC nor could it generate any revenue on account of consultancy and maintenance services as there were no agreements concluded.

NIC stated in February 1994 that it had realised Rs 98.79 lakhs on account of usage of the 'Z' software package including the share of ONGC (Rs 40.80 lakhs) towards the initial cost of copyrights.

Thus, the decision of NIC to procure the copyrights for the 'Z' software and the investment of Rs 106.52 lakhs had not yielded the projected revenues.

Un-serviceable/slow/non-moving stores

(i) There was an inventory of about two thousand items of spare parts for which NIC is keeping numerical accounts. In the absence of valuation account, the total value of stores

at the close of March 1993 could not be worked out. Examination of records relating to the period 1986-93 revealed that 70 spare parts valuing Rs 114.90 lakhs were lying in stores without use for periods ranging from one to four years. Advance procurement of stores not needed within reasonable time and non-utilisation of stores resulted in blocking of funds to the tune of Rs 114.90 lakhs. Moreover computer hardware is an area where there is rapid obsolescence and the residual value may be minimal. This could have been avoided with proper planning for materials procurement. NIC furnished (September 1993) following reasons in support of retention of spares:

- Consumption of spares was less because of good reliability of the systems.

- Lead time taken for procurement of spares is more than six months.

- The stock of spare parts is commensurate with the requirement of the systems. Though some of the items are slow moving, it is still advisable to stock them in the long term interest.

- As the systems have become old, the spares are not available in the market.

The reply of NIC is not tenable as NIC has not fixed any norms for keeping stocks of spare parts.

(ii) During test-check of records it was noticed that 232 stores items were lying with NIC and State Informatics Centres for one to three years. However, the book value of most of these stores items were not made available. NIC had not initiated any action for declaring these stores unserviceable or issued orders for their disposal.

NIC stated in January 1994 that a committee had been set up for examining and disposing of surplus and obsolete items.

(iii) According to records maintained in spare parts stores of NIC, 88 cases of loss of print heads took place during 1986-93. In most of the cases, neither was any departmental action initiated nor was the matter reported to police authorities. The cost of the print heads in various cases

was also not assessed and written off by the competent authority.

NIC stated in January 1994 that sanction of the competent authority was obtained for writing off the loss of print heads. Other formalities for issue of write off orders were underway.

Excess payment of customs duty, demurrage, etc. on imported stores

(i) During test-check of purchase cases of imported stores, it was noticed that NIC took 20 to 120 days for clearance of various consignments from the date of their receipt at the airport, resulting in expenditure of Rs 4.23 lakhs as demurrage charges for clearance of 36 consignments during 1986-93. The payment of demurrage charges could be minimised/avoided in case NIC had taken timely and prompt action at the time of receipt of cargo arrival notices. NIC had not taken any action to get the losses on account of demurrage regularised. The reply of NIC that the delay in clearance was mainly due to late receipt of cargo arrival notice from airlines is not tenable as there were other reasons also for delay in clearance like delay in handing over OGL certificates and customs duty payment challans to the clearing agent and delay in obtaining customs duty exemption certificate.

NIC stated in January 1994 that the action was being taken to reduce and avoid demurrage charges and also proposed to issue necessary sanction in each case.

(ii) Scientific/technical equipment imported for research projects are exempted from payment of customs duty if the 'Not Manufactured in India Certificate' (NMIC) is obtained from Directorate General of Technical Development before actual placement of order/procurement of equipment. If NMIC is not procured timely, customs duty is paid and refund obtained later after production of the documents.

NIC had not maintained any separate register/record to watch the cases where customs duty paid on the imported equipment was recoverable. NIC stated in January 1994 that as the number of cases relating to recovery of customs duty were only a few, these were being monitored through files.

During test-check it was observed that NIC had paid customs duty of Rs 50.13 lakhs in the following two cases for which either the claims for refund had not been lodged with the customs authorities/foreign firms or wherever lodged remained outstanding:

(a) A purchase order for supply of software for HP-3000 computer system at Rs 2.91 lakhs was placed on the foreign firm in June 1987. The stores despatched by the firm were cleared in December 1987 after making payment of Rs 1.74 lakhs as customs duty. NIC lodged a claim in February 1988 with the customs authorities for a refund. The claim for refund is still pending. NIC reminded customs authorities in August 1993 and December 1993.

(b) NIC placed two purchase orders in December 1991 on a foreign firm for procurement of computer based 'VSA' terminal equipment and computer based hub system (DMN 2000) at Rs 50.53 lakhs and Rs 119.23 lakhs respectively. NIC made the request for duty exemption to Ministry of Finance only in May 1992 and the customs duty exemption certificate (CDEC) for both the equipment was obtained during September 1992. While the computer based hub system which arrived at New Delhi airport on 17 June 1992 was cleared duty free during September 1992, the computer based VSA terminals arrived partly during May 1992 and October 1992 at Bangalore airport and was cleared paying Rs 45.01 lakhs and Rs 3.38 lakhs as customs duty. The customs duty of Rs 48.39 lakhs had to be paid by NIC due to its failure to obtain CDEC before the receipt of equipment at the airport. NIC had not lodged any claim for refund of Rs 48.39 lakhs with the customs authorities as of January 1994.

Besides, payment of customs duty was again made in the under-mentioned cases for replacements for short-shipped and damaged items though customs duty for the main systems had already been paid. The reasons for making double payment of customs duty were not on record.

(c) NIC placed a purchase order on a foreign firm in February 1990 for supply of 'Frame Grabber Cards for image processing on computer' at a cost of Rs 3.65 lakhs. The consignment despatched by the firm was cleared by NIC in May 1990 after payment of customs duty of Rs 3.85 lakhs. During testing of the equipment at NIC Hyderabad, one part was not found to be in working condition. In July 1990, NIC took up

the matter with the Indian agent of the foreign firm for rectification of the defects. The foreign firm despatched the replacements on no charge basis during September 1990. NIC did not obtain the necessary CDEC before the arrival of the stores at airport with the result that it had to pay one lakh rupees as customs duty for clearance of the consignment. A claim for refund was also not lodged with customs authorities or with the firm. NIC stated (January 1994) that claim for refund of customs duty had since been lodged in August 1993 with the firm and NIC was following up the matter with customs authority.

(d) NIC placed an order on a foreign firm in July 1986 for supply of Tektronix Add-ons. The stores valued at Rs 2.25 lakhs were received at Delhi airport during December 1987 and were cleared paying Rs 1.77 lakhs as customs duty. During installation of the equipment it was noticed that the firm had not supplied the accessory kit and cable. On taking up the matter with the Indian agents, the firm supplied the short-shipped items in May 1988 which were cleared by NIC making payment of customs duty of Rs 1 lakh. NIC lodged a claim for refund of customs duty of Rs 1 lakh with the customs authorities in November 1988 but did not pursue the claim thereafter.

NIC stated in January 1994 that the matter had been followed up for refund of customs duty during December 1993.

8.1.8 Physical verification of stores

Physical verification for coolers, air-conditioners and vehicles was last conducted during March/April 1989. According to that report 16 air-conditioners issued to State Informatics Centres were lying uninstalled with them. Details of further action on the report of physical verification were not available. Physical verification of technical stores was last conducted during March 1991 and physical verification of spare parts stores had not been conducted so far (August 1993). Physical verification of non-consumable stores of seven Regional/State Informatics Centres had also not been conducted since their inception.

In the absence of periodic and complete physical verification, the correctness of stores could not be vouchsafed and the possibility of misappropriation cannot be ruled out.

There were numerous discrepancies between the stores issued by NIC and those accounted for by the State Informatics Centres. Details are given in *Appendix V*.

NIC stated in January 1994 that necessary reconciliation of the discrepancies would be carried out at the time of conducting fulfledged physical verification of NIC stores distributed throughout the Central Government and State Government departments and District administration including NIC's State/Regional Centres.

8.1.9 Other interesting points

(i) NIC had set up a satellite based network for data transmission under NICNET programme with effect from January 1987. At the request of NIC, Department of Telecommunications (DOT) arranged leasing of a transponder from a foreign agency for use of NIC and for which payment on quarterly basis at US $ 3.40 lakhs per quarter was to be made through a PSU under DOT. NICNET was operative on Intelsat upto 13 December 1990 when it switched over operation to Insat-1D. The payment of leasing charges to Intelsat for the period December 1990 to May 1991 amounting to Rs 49.61 lakhs was not in order.

DOT raised a demand of Rs 147.20 lakhs on NIC in June 1992 covering charges for space of transponder No.6 for the period 13 December 1990 to 31 May 1993 at Rs 14.72 lakhs per quarter. NIC released the payment in January 1993 without contesting the payment upto 31 May 1991 which had already been made, thus making double payment for this period. The excess payment for leasing of satellite worked out to Rs 49.61 lakhs which had not been adjusted (August 1993).

NIC while accepting the overlap payment over a period of five months stated in September 1993 that the continued lease of the foreign transponder was a technical necessity to switch over NICNET from one satellite to another. The reply is not tenable as consequent on switching its operation from Intelsat to Insat-1D, NIC did not take timely decision to surrender the lease on the Intelsat transponder.

(ii) NIC has been sanctioning advances to firms, government officers and personnel regularly in connection with purchase of stores etc. It was observed from the records maintained

by NIC that advances amounting Rs 4207.88 lakhs were lying unadjusted for over 17 years as mentioned below:

Year	Number of suppliers/ bills	Outstanding amount (Rs in lakhs)
1976-77	5	0.72
1977-78	2	0.16
1978-79	3	7.86
1979-80	12	16.63
1980-81	17	14.42
1981-82	18	7.66
1982-83	38	14.65
1983-84	34	26.51
1984-85	18	1.65
1985-86	87	694.42
1986-87	51	110.46
1987-88	51	157.87
1988-89	127	171.49
1989-90	137	207.21
1990-91	106	136.40
1991-92	114	688.95
1992-93	196	1950.82
Total	1016	4207.88

NIC stated in January 1994 that 80 *percent* of the equipment cost released on delivery had been treated as advance and adjustment of such advances had not taken place in the accounts upon payment of balance amount of the bills. However, reconciliation of the figures with PAO was being carried out for early adjustment of advances.

CHAPTER IX

Department of Science and Technology

9.1 Irregular purchase of vehicle

The proposal of the Survey of India (SOI) for purchase of staff cars for the zonal chiefs was not approved (October 1991) by the Department of Science and Technology due to stringent financial position and instructions of Government of India for observance of economy. In disregard of these orders, the eastern zonal office of SOI advised (December 1991) the eastern circle office to procure one car for the zonal office out of the funds sanctioned for project work carried out by the latter. Accordingly, a demand draft of Rs 1.70 lakhs being the cost of an Ambassador car was obtained in January 1992 from the sponsor of a project as a part of the advance against total cost of the project (Rs 13.97 lakhs). In addition, in March 1992 an amount of Rs 0.23 lakh was spent on the new vehicle for extra fitting and upholstery work. The car was being used by the Additional Surveyor General of the eastern zone.

The expenditure of Rs 1.93 lakhs incurred on purchase of the staff car and its fittings was unauthorised as necessary sanction and budget provision were not available.

The matter was referred to the Department in August 1993; their response was awaited (February 1994).

9.2 Budget management

Review of Appropriation Accounts of the Department of Science and Technology for the five years 1988-93 revealed that heavy re-appropriations were made under various heads as the trend of expenditure did not match the budget estimates. While framing the budgetary estimates the Department did not take into account trend of actual expenditure in the preceding year and as a consequence it failed to make realistic assessment of funds requirement. The trend of heavy re-appropriation under the same sub-head continued for years together. Details are given in *Appendix VI*.

It was also seen that even after re-appropriation of funds, there were huge excess/savings under the various sub-heads which indicate that proper assessment of requirement of funds was not made even at the time of issuing the re-appropriation orders. Details are given in *Appendix VII*.

Some illustrations where the Department had issued the re-appropriation orders though the actual expenditure was much less than the original grants and vice versa are given below:

Year	Sub-head	Original grant	Grant after re-appropriation	Actuals	Savings
			(Rs in lakhs)		
1990-91	3425-C.2 (2)(2)(3) Multi-disciplinary Research in Engineering (SERC)	360	382.00	355.19	(-) 26.81
1991-92	3425 C 2(3)(1) National Centre for Medium Range Weather Forecast	432	489.22	372.29	(-)116.93
1992-93	5455-BB.3(1) (1) Equipment	310	260.50	385.00	(+)124.50

It was noticed that the Department had surrendered 14 to 100 *percent* of the amounts available under various sub-heads during the last week of March every year (details given in *Appendix VIII*) indicating that no vigil was kept over the trend of progressive expenditure under the various heads. The belated surrender of funds is indicative also of inadequacies in the accounting information system.

Total grants and surrenders under capital section during the years 1990-93 were as detailed below:

Year	Total grant	Surrender	
		Amount	Percentage (of total grant)
		(Rs in lakhs)	
1990-91	3075	944.30	30.7
1992-93	3050	1149.00	37.6

Though the progress of works was slow, budgetary estimates had not been prepared keeping in view the progress of works. Had the Department monitored the progress of expenditure properly the savings could be anticipated and surrendered earlier than in March.

CHAPTER X

Department of Space

10.1 Physical Research Laboratory

10.1.1 Introduction

Physical Research Laboratory (PRL), Ahmedabad was founded by the late Dr Vikram A. Sarabhai in November 1947. From 1963 onwards Department of Atomic Energy (DAE) became the major contributor of funds to PRL and it was registered as a Trust in November 1965. Subsequently on creation of Space Commission and Department of Space (DOS) in 1972, PRL became a grantee institution of DOS. The main objective of PRL is research in space science.

10.1.2 Organisational set up

PRL is headed by a Director and is managed by a Management Council (MC) consisting of a chairman, six members and a secretary. The MC is assisted by a Finance Committee and the Director is supported by an advisory board and a few committees. Two meetings of MC were required to be held every year. But only one meeting was held every year during 1987-92 and in 1988 no meeting was held.

As of April 1993, PRL had 561 personnel of which 133 were scientists, 199 technical and 229 administrative and auxiliary staff. No norms had been fixed for staff requirements. Taking into account the normal ratio of 2:1:1 in a R&D organisation, the expenditure on excess technical, administrative and auxiliary staff worked out to Rs 7.82 crores for the period 1987-93.

10.1.3 Scope of audit

PRL is audited under Section 14 of the Comptroller & Auditor General's (Duties, Powers and Conditions of Service) Act, 1971. This review attempts to present an insight into the performance of PRL as observed during a test-check of its transactions pertaining to the period 1986-93.

The draft review was referred to the Department of Space in December 1993; their response was awaited (February 1994).

10.1.4 Highlights

- There were no norms for scientific, technical and non-technical staff requirements. As a result, an expenditure of Rs 7.82 crores was incurred on excess supporting staff.

(Para 10.1.2)

- During the six years 1987-93, PRL received grants totalling Rs 42.61 crores from DOS and Rs 2.17 crores from other sources.

(Para 10.1.5)

- Out of 50 in-house programmes including 25 undertaken during 1987-93, only 14 were completed and 36 were continuing at the end of 1992-93. Four programmes were ongoing for more than 10 years.

Out of 13 sponsored projects including nine projects undertaken during 1987-93, eight were completed. There was cost overrun ranging from Rs 1.15 lakhs to Rs 61.50 lakhs and time overrun of 12 months to 50 months in these completed projects.

In April 1976, PRL decided to set up an infra red telescope (IRT) at Mount Abu for research purposes at a total cost of Rs 52 lakhs. The cost was revised to Rs 192.44 lakhs in December 1984. Even after 16 years and spending Rs 367.16 lakhs, IRT has not been commissioned.

Department of Electronics (DOE) entrusted the project: 'Appropriate Automation Promotion Programme' (AAPP) to PRL in January 1984 for automation of textile industry. This was not within the purview of PRL as PRL's main objective was to conduct research in space science for DOS. The project had not been completed even after nine years and spending Rs 199.92 lakhs by DOE against the estimated period of five years.

Department of Science and Technology (DST) approved a project in April 1977 for setting up of Inter-planetary Space (IPS) stations at a cost of Rs 27.76 lakhs for a period of six years. Although three stations at Thaltej (Ahmedabad), Surat and Rajkot were set up at a cost of

Rs 40.11 lakhs, and with delay of three years, the Surat station was closed in April 1992 and the Rajkot station was not giving continuous data. Thus, due to closure/non-working of the two IPS stations expenditure of Rs 27.40 lakhs on their setting up had proved unfruitful. The fate of the third station at Thaltej is also uncertain due to radio broadcast interference.

Department of Commerce, United States of America approved a project: 'Coordinated Studies of Solar X-ray and optical wave length and travelling inter-planetary phenomena during solar maximum year and beyond' in April 1987 at a cost of Rs 89.90 lakhs for a period of five years. The objectives of the project to collect data from 1000 stellar radio sources and transfer of IPS data to USA had not been achieved even after lapse of six years and spending Rs 92.95 lakhs.

DST approved a project: 'Faint Object Astronomy with Charged Coupled Devices (CCD) Camera' in August 1984 at a total cost of Rs 16.22 lakhs for a period of four years. Although PRL developed a CCD camera at a total cost of Rs 23.63 lakhs with a delay of more than two years, the ultimate objective of use of CCD camera in Indian telescopes had not been achieved.

(Para 10.1.6)

- Physical verification of stores at PRL and other subsidiary units at Mount Abu, Udaipur and Thaltej had not been conducted since inception.

(Para 10.1.8)

- Due to non-investment of excess funds in term deposit, PRL incurred loss of interest of Rs 1.09 crores.

(Para 10.1.10)

10.1.5 Finance and Accounts

PRL is financed by grants-in-aid from DOS. The grants received and expenditure incurred during 1987-93 are indicated below:

Year	Grants received from DOS		Non-recurring grants from other sources and other income	Total	Expenditure		
	Capital	Revenue			Capital	Revenue	Total
					(Rs in lakhs)		
1987-88	98.00	386.83	19.09	503.92	58.12	398.14	456.26
1988-89	172.30	424.20	15.59	612.09	215.58	457.57	673.15
1989-90	120.00	487.45	26.76	634.21	107.45	520.41	627.86
1990-91	147.00	568.90	25.94	741.84	126.45	576.22	702.67
1991-92	291.68	607.18	28.12	926.98	148.78	632.58	781.36
1992-93	302.97	654.92	101.99	1059.88	257.90	732.65	990.55

10.1.6 Research activities

(i) Research activities of PRL had been divided into two categories viz. in-house programmes and sponsored projects. The in-house programmes are selected in the annual review of scientific activities of PRL. The sponsored projects are selected by different agencies on the basis of project proposals submitted by PRL scientists. The in-house programmes are reviewed by the Director annually taking into account opinion of the division chief and senior scientists of the laboratory. However, no records of review of in-house programmes were maintained.

PRL had no research advisory council (**RAC**) with outside experts for reviewing progress of their research activities. The scientific activities of the preceding year and proposed activities for current year are presented annually to MC. However, MC did not go into the details of the projects. The scientific work and the progress made under sponsored projects of DOS is being reviewed by a Scientific Advisory Committee (**SAC**) appointed by the Chairman, Indian Space Research Organisation (**ISRO**).

PRL had undertaken sponsored projects of applied research viz. development of charged coupled device (**CCD**) camera related to electronics and appropriate automation promotion programme (**AAPP**) related to textiles etc. which were outside

its mandate. The CCD camera technology developed by PRL has not been transferred and was not in use in telescopes in India or for research purpose in PRL.

(ii) In-house programmes

The position of in-house projects/programmes undertaken by PRL during 1987-93 was as under:

Year	Opening balance	New projects undertaken	Total projects	Projects completed	Projects ongoing at the end of the year
1987-88	25	6	31	1	30
1988-89	30	7	37	1	36
1989-90	36	4	40	6	34
1990-91	34	4	38	3	35
1991-92	35	2	37	1	36
1992-93	36	2	38	2	36
	Total	25		14	

Out of the 36 ongoing projects at the end of March 1993, four were going on for more than ten years.

(iii) Sponsored projects

The position of sponsored projects undertaken by PRL during 1987-93 was as under:

Year	Opening balance	New projects under-taken	Total Projects	Projects completed	Projects ongoing at the end of the year
1987-88	4	3	7	-	7
1988-89	7	-	7	2	5
1989-90	5	2	7	1	6
1990-91	6	2	8	1	7
1991-92	7	2	9	1	8

1992-93	8	-	8	3	5
Total		9		8	

Out of the eight projects completed, the stated objectives could not be achieved in two and one was transferred to another institute without achieving its objectives. Cost overrun on sponsored projects ranged between Rs 1.15 lakhs and Rs 61.50 lakhs and time overrun between 12 months and 50 months. Some instances are mentioned below:

(a) In 1976, PRL took up a DOS sponsored project for setting up of an one meter infra red astronomy telescope (IAT) indigenously at an estimated cost of Rs 52 lakhs at Gurushikhar near Mount Abu to enable its scientists to study physics with infra red astronomy and handle some specific problems of immediate interest. The air glow observatory of PRL, which was set up in 1962 at Mount Abu, was to serve as base for the proposed observatory. To allocate the responsibilities for different systems of the telescope, DOS constituted in 1980 a project management board consisting of ISRO and PRL scientists and a high level committee on the recommendations of PMB. DOS approved the revised cost of Rs 143.12 lakhs in April 1981 and Rs 192.44 lakhs in December 1984. An amount of Rs 209.09 lakhs including capital and repair expenditure of Rs 11.43 lakhs pertaining to the mirror which was prepared by the Indian Institute of Astrophysics, Bangalore was spent till March 1990 on this project in addition to the expenditure of Rs 158.07 lakhs on the observatory at Mount Abu and its day to day maintenance during 1986-93. The IAT has not yet been commissioned (November 1993) even after spending Rs 367.16 lakhs against the original cost estimate of Rs 52.00 lakhs as visualised in 1976 and project having continued for over 16 years, resulting in adverse effect on the research programmes of PRL as well as many other projects related thereto.

PRL stated in May 1993 that the instruments developed were being used at one of the three other telescopes in India and none of the instruments were kept idle and hence no project had been adversely affected. This was not tenable because progress reports of DST projects had stated that further research work would be done on commissioning of 120 inch telescope at Mount Abu.

(b) Appropriate automation promotion programme

To promote the applications of the appropriate automation technique in small, medium and large industries through awareness creation, training and system engineering, DOE had set up four Appropriate Automation Promotion Centres **(AAPC)** at Delhi, Ahmedabad, Trivandrum and Calcutta. The Western Regional Centre **(WRC)**, Ahmedabad was set up at PRL though the area of research did not come under its ambit.

The Ministry of Finance signed a project document with United Nations Development Programme **(UNDP)** in May 1982 for assistance of US $ 653200 (Rs 78.38 lakhs @Rs 12 per US $) for the project with the Government's input of Rs 130 lakhs. The project was expected to commence in May 1982 to be completed in five years. The project was aimed to help automatise Indian industries to increase productivity and quality without displacing labour. WRC was entrusted with industrial control technology and automation of textiles industry with the objectives:

- to strengthen the regional centre in developing and organising comprehensive training courses in textiles for training approximately 15 engineers annually at the centre;

- to conduct studies on socio-economic impact of automation in textile industry;

- to establish a cell in the regional centre for providing guidance to small and medium scale industries in selection of appropriate automation technologies.

The memorandum of understanding for execution of the project in PRL was signed by PRL and Electronics Commission **(EC)** in January 1984. EC released an amount of Rs 154.76 lakhs during 1983-92. PRL also earned interest of Rs 0.66 lakh on investment of project fund in term deposit. PRL provided the project funds of Rs 39.47 lakhs to Ahmedabad Textile Industries Research Association **(ATIRA)** and Bombay Textiles Research Association **(BTRA)** for the collaborative projects under AAPP. BTRA joined the project in January 1986. In addition, ATIRA received Rs 44.50 lakhs directly from DOE during 1990-93. Out of Rs 115.95 lakhs (including interest earned of Rs 0.66 lakhs) thus left with PRL, an amount of Rs 94.40 lakhs was spent on the project during 1983-92 and

balance of Rs 21.55 lakhs was transferred to ATIRA in April 1991 alongwith certain assets and technical staff. An expenditure of Rs 177.35 lakhs was incurred on this project in March 1993. But objectives of the project were not achieved (October 1993).

Even though the project was transferred to ATIRA, equipment worth Rs 5.01 lakhs were retained by PRL.

PRL had undertaken nine sub-projects in the beginning and also proposed in November 1985 to undertake nine more sub-projects for textile industry in collaboration with ATIRA. However, out of the eighteen sub-projects only one viz. evenness testing system was completed by PRL and the technology had been licenced to twenty units. Loom monitoring system was in the process of technology transfer as of October 1993. As regards nine out of eighteen sub-projects undertaken by ATIRA in collaboration with PRL, work on two sub-projects had been completed by ATIRA, the work on two sub-projects was in progress, five projects were not initiated as they were in the proposal stage only and the two sub-projects were initiated and terminated within a short duration due to manufacture of products indigenously under foreign know-how. Majority of the sub-projects envisaged during the progress of the project had not been completed.

PRL had not completed the work on seven projects which were projected in the beginning. The objectives of developing and organising comprehensive training courses in textiles for training approximately 15 engineers annually to conduct studies on socio-economic impact of automation in the specified area and to establish a cell for providing guidance to small and medium scale industries in selection of appropriate automation technologies had not been achieved even after lapse of nine years and release of Rs 199.92 lakhs (including Rs 0.66 lakh interest earned by PRL) by DOE to PRL and ATIRA upto March 1993.

(c) Closure of Surat observatory

A project: 'Solar activity and inter-planetary space' intended to design, develop and commission three site radio observatories for measurement of solar wind velocity using inter-planetary scintillation (IPS) technique, and use of IPS data for study of IP disturbances was approved in April

1977 by DST at a cost of Rs 27.76 lakhs for a period of six years. With the help of this project, PRL could develop the capability of recording scintillation from a large number of radio sources distributed at different halo-latitude and elongations for determination of solar wind velocity. The project commenced in April 1977. Three sites for IPS observatories at Thaltej (Ahmedabad), Rajkot and Surat were selected after making noise survey of three sites by Ministry of Communications and the first observatory was set up at Thaltej in 1980. PRL sought extension of the project in 1982. In August 1990 DST also approved the further revised cost of Rs 38.45 lakhs. The observatory at Thaltej and Rajkot were set up by 1982-83. The capacity of Thaltej antenna aperture was doubled to 10,000 M2 in April 1984 and Surat telescope was commissioned in May 1986.

Against the sanctioned cost of Rs 38.45 lakhs, PRL had received Rs 38.72 lakhs and spent Rs 40.11 lakhs during 1977-91. The excess expenditure of Rs 1.39 lakhs was transferred to the Indo-US project: 'Coordinated studies of solar radiations of radio x-ray and optical wave length and travelling inter-planetary phenomena'.

The telescopes at Rajkot and Surat were operational only intermittently due to fluctuations in electricity supply. Even with the use of uninterrupted power supply system **(UPS)** they could only collect discontinuous data which could not be meaningful. At Surat, good observations could not be taken for four to five months in a year due to the severe monsoon and the prevalent single station velocity method, pioneered by Ooty astronomers; it was found possible to obtain daily IPS velocities with the help of a single telescope. In view of this the project coordinator recommended closure of the two observatories at Surat and Rajkot.

Director, PRL did not accept the recommendation for closure of IPS Rajkot station on the basis of single station velocity method, as this concept had not been fully accepted by the scientific community. However, the Surat station was closed in April 1992.

As regards IPS data of Thaltej field station, PRL had intimated the Department of Telecommunications in May 1993 that the frequency modulation **(FM)** band of Godhra was affecting the IPS data being collected at Thaltej. All India

Radio (AIR) was planning to set up a FM transmitter at Thaltej and this interfered with the operation of the radio telescope.

Due to closure of Surat station and non-receipt of continuous IPS data from Rajkot, expenditure of Rs 27.40 lakhs on setting up of these two IPS stations proved to be unfruitful. The fate of IPS Thaltej was also uncertain due to the FM transmitter to be set up by AIR.

(d) Indo-US project on inter-planetary phenomena

In November 1986, PRL sent a proposal for a project: 'Coordinated studies of solar radio, x-ray and optical wave lengths and travelling inter-planetary phenomena during solar maximum year and beyond', to the United States of America (USA) for funding.

This was to be a collaborative project between India and USA. The project was accepted by the foreign collaborator in April 1987 and as per an agreement (May 1987) five Indian scientists were to work on experimental aspects and ten US co-investigators on developing 3-D MHD modelling at inter-planetary disturbances. The total estimated cost of the project was Rs 89.90 lakhs with a duration of five years.

To achieve the objectives of the project , PRL proposed to transfer the IPS data from Rajkot and Surat to PRL using dedicated telephone lines. This involved an automated operation of each telescope by means of a microprocessor based control system and one such system had already been developed in November 1986 at Thaltej.

It was necessary to establish telex/satellite link to transfer solar wind velocity and 'g-map' data to National Oceanic Atmospheric Administration (NOAA), USA. After achieving this real time capacity, it was proposed to expand the antenna array aperture at Thaltej to enable detection of larger number of scintillators.

The project commenced in July 1987. Out of Rs 89.90 lakhs sanctioned for the project, Rs 7 lakhs were to be retained by US Embassy to meet travel expenditure of US participants visiting India. In May 1988, PRL submitted a revised project proposal for Rs 157 lakhs. However, the foreign collaborator approved in November 1990 the revised cost at

Rs 105.38 lakhs for the project and PRL received Rs 99.04 lakhs and spent Rs 92.95 lakhs on the project during 1987-93.

Summary of the achievements of the project revealed that out of 32 units of antenna system to be modified only 12 units of new double channel receivers for 'g' mapping were fabricated. The shortfall in achievement of objectives were as under:

- The augmentation of data transfer from Thaltej, Rajkot and Surat had not been completed to realise near real time calculation of solar wind velocities at Ahmedabad and quickly sending the same to NOAA, USA.

- After establishing the IPS data transfer system to Ahmedabad and transfer to NOAA, USA, antenna aperture was to be expanded to detect a large number (1000) stellar radio sources thereby constituting a close knit grid of such sources. The work of detecting the large number of radio sources (1000) had not started. Only one source was detected as of May 1993.

- The system was required to be developed for producing 'g- maps'. However, the system was yet to be fully developed for this.

- A real time capability, oriented to operational use of National Physical Laboratory and Space Environment Laboratory viz. satellite and telex links was envisaged during fifth year of the project i.e. by March 1992. This objective had not been achieved even after one year of the targeted date.

IPS field station at Surat needed either relocation or enough security for the present site. The telescope also needed to be refurbished.

The objective of transfer of data from Rajkot and Surat to PRL, had not been achieved due to closure of IPS Surat and non-receipt of continuous data from Rajkot and the objective of transfer of data to NOAA, USA had not been achieved due to non-availability of highly reliable telephone lines. Thus, the project failed in its mission even after spending Rs 92.95 lakhs. The targeted date of completion of the project was March 1992.

(e) Faint object astronomy with charged coupled devices camera

DST approved in August 1984 the project: 'Faint object astronomy with charged-coupled devices (CCD) camera' at a cost of Rs 16.22 lakhs for a period of four years to study distant and faint objects in the universe and develop CCD camera technology within the country.

The development of CCD camera was expected to change the capabilities of the existing Indian telescopes. A 40 inch telescope could effectively be used as a 120 inch to 215 inch telescope for light gathering.

The project commenced in June 1984 and was required to be completed by May 1988. The project cost was revised first to Rs 20.52 lakhs in July 1986 and then to Rs 23.26 lakhs in March 1987 on account of additional equipment, salaries and price escalation. The project was extended upto August 1990 and PRL spent Rs 23.63 lakhs upto November 1992. There was cost overrun of Rs 7.41 lakhs and time overrun of two years in completion of the project.

The project completion report stated that the project was completed in September 1990, the camera was in operation and data on 6inch/14inch telescopes were taken. Extreme scientific work was to be taken up on 1.2m IR telescope which was not fully operational. Further work was to be done on 1.2m IR telescope when the telescope became operational at Mount Abu. However, the CCD technique developed by PRL is not being used in Indian telescopes.

10.1.7 Materials management

(i) Purchase

Purchase procedure adopted by PRL in 1989 was based on the purchase procedure of DOS. The following irregularities/ deficiencies were noticed in test-check:

(a) Processing and coverage of indents

The indents remaining uncovered at the end of every year were cancelled and fresh indents were raised every year. No

time limit had been prescribed for inviting and finalisation of tenders.

Items valuing over Rs 1 lakh were required to be procured through open tender. However, in large number of such cases limited tender enquiry had been resorted to. Repeat Orders were placed long after the prescribed time limit of six months from the date of placement of original order and without ascertaining the price trend.

(b) Import on CIF basis

Under the financial rules, all purchases involving import of materials were as a rule to be on FOB basis and full consideration was to be given by the competent authority to the element of foreign exchange involved therein so as to keep it to the minimum. PRL had, however, made imports on CIF basis resulting in avoidable outflow of foreign exchange to the extent of Rs 7.44 lakhs in 21 cases test-checked.

(c) Replacement of telephone exchange

Advertised tender enquiry was issued for procurement of telephone exchange (EPABX) systems for PRL and Thaltej and tenders were opened in July 1989. The tender enquiry stipulated that the system should preferably be with facility to augment it later for data communications but did not pin point that the system was required to handle transfer of data on telephone lines.

The purchase order was placed in October 1989 on firm 'N' at the negotiated price of Rs 17.18 lakhs, stipulating delivery period of 3 to 6 weeks. The systems were received in PRL in March 1990 and were installed in April 1990. Because of some inherent and unresolved problems, the system could not be made fully operational. However, PRL paid the entire amount of Rs 17.18 lakhs to the firm without ensuring commissioning.

Because of failure to stipulate that the system had to handle transfer of data on telephone lines, the objective of transfer of data from Thaltej field station to PRL through EPABX system was not achieved.

Even after spending Rs 17.18 lakhs, PRL had not achieved the main objectives of EPABX of transfer of data, text and image

to NOAA, USA under the Indo-US co-operative project. The other objective of direct telephone (like intercom) between the two campus i.e. PRL and Thaltej at Ahmedabad was also not achieved.

PRL accepted in September 1993 that no data had been transferred to NOAA.

(ii) Non-installation/non-commissioning of equipments

Due to non-installation/non-commissioning/non-utilisation of equipments, funds to the extent of Rs 42.15 lakhs were idling as mentioned below:

(a) A gas chromotograph mass spectrometer required for separation and detection of various trace gases was purchased at the cost of US $ 104665 (Rs 27.78 lakhs). The equipment was received at PRL in February 1993 but had not been installed so far (April 1993) as one of the cards was defective.

(b) An air ozone analyser required for the project: 'surface ozone monitoring' was purchased from a French firm at a total cost of Rs 4.21 lakhs. The equipment arrived at Ahmedabad in November 1992 and was received at PRL in February 1993.

As UV lamp and solenoid valve were found to be defective, the equipment could not be installed. In February 1993, the defective parts were replaced by the supplier. But the equipment was yet to be fully commissioned as of February 1993 on account of speed problems in computer.

PRL stated (May 1993) that both the units were working. However, no log book or any other records were shown to Audit in support of this contention.

(c) PRL placed a purchase order in March 1989 for 18 mm active diameter imaging phiton detector with accessories at a cost of Rs 10.16 lakhs on a UK firm.

The equipment was received at PRL in October 1989 and was made operational in December 1989. In September 1990, PRL reported a snag and the supplier agreed to replace the PC free of cost for which the equipment was to be returned to them during the warranty period.

PRL obtained a 'non-repairable in India certificate' (NRIC) from supplier and the requisite certificate from the Directorate General of Technical Development (DGTD) in November 1991 to enable to re-export the PC to UK. However, the PC was not re-exported (May 1993) even after lapse of two and half years since development of the snag.

PRL stated in May 1993 that the PC was not re-exported to UK for repairs within the warranty period due to delayed receipt of NRIC from DGTD. The replacement charges of the mother board was Rs 24885 (UK 900) which was higher as compared to the hardware prices.

(iii) Physical verification of stores

Physical verification conducted in 1984 revealed that 110 items costing Rs 5.95 lakhs were not available. The discrepancy had not been reconciled so far (November 1993).

Besides, book and ground position of the equipment and dead stock at PRL and its subsidiary units at Mount Abu, Udaipur and Thaltej had not been reconciled since inception. Thus, loss of stores, if any, was not ascertainable.

(iv) Non-maintenance of log book for equipments

PRL had acquired equipments/dead stock items worth Rs 1398.29 lakhs in the past several years. But no log book was maintained for these equipment.

In the absence of log books the utility of the equipment or otherwise could not be ascertained.

10.1.8 Estate management

Under-utilization of building space

Proposal for construction of additional five floors in the main building and additional library floor over library block was made in 1972 to cater to the requirements of PRL in the next five years. It was also expected that the third floor of the building occupied by ISRO/SITE Project would be vacated. However, the expansion of PRL had not taken place as envisaged in the proposal. The present staff strength of PRL was only about 400 (excluding auxiliary staff and apprentices). Thus, the additional five floors built in

1972-75 at a cost of Rs 37.89 lakhs had become excess. Despite this space being available, expansion of library building was also carried out subsequently in 1990-91 at a cost of Rs 19.36 lakhs. Justifying the expenditure of Rs 57.25 lakhs PRL stated in May 1993 that the construction was taken up in view of:

- approval of the Planning Commission to set up a Plasma Physics Group;

- acceptance of a project for Development of Space Technology and Methods of Remote Sensing;

- transfer of Geophysical Division of the Tata Institute of Fundamental Research (TIFR) to PRL; and

- inadequate availability of space versus number of scientists and technical staff resulting in working in over crowded rooms.

However, the plasma physics group was established but shifted out of PRL in 1986. Similarly, there was transfer of geophysics group from TIFR to PRL but the staff transfer was inadequate. Hence, none of the objectives for which the provision of the building was required could be met resulting in unproductive expenditure. The expansion of PRL in terms of staff had not taken place as envisaged in the proposal for additional five floors.

10.1.9 Other interesting points

(i) Loss of interest due to non-investment of funds

Yearly average balance available in the current accounts of PRL during 1987-93 was ranging from Rs 89.86 lakhs to Rs 421.74 lakhs as detailed below:

Year	Average closing balance (Rs in lakhs)
1987-88	89.86
1988-89	108.63
1989-90	146.71
1990-91	187.34
1991-92	191.24
1992-93	421.74

Due to non-investment of the excess money in term deposit, PRL incurred loss of interest of Rs 108.68 lakhs.

While approving the audited accounts of PRL for the year 1989-90, MC had pointed out in July 1991 that in view of the large amount of balances kept in the current account, possibilities to deposit the money in short-term deposits may be explored with DOS. Final concurrence from DOS in this regard was awaited (April 1993). PRL stated in May 1993 that the excess money would be deposited in term deposits after obtaining clearance from DOS.

(ii) Non-accounting of assets of closed sponsored projects

PRL had undertaken sponsored projects funded by outside agencies and departments like Science and Technology and Electronics. After completion of a project the value of equipment and other permanent assets was required to be capitalised in PRL account after obtaining consent of the sponsor to treat the equipments as gifted. But, no such action had been initiated. The equipments and dead stock items worth Rs 133.31 lakhs in respect of 22 sponsored projects already completed as of April 1993 were yet to be taken in the accounts of PRL.

PRL stated in May 1993 that all the equipments were with the concerned divisions where the project scientists worked and these would be transferred to PRL equipment inventory on their approval.

(iii) Losses on departmental canteen

PRL had established canteen facilities for their employees and for the guest house. Annual accounts of PRL for the period 1987-93 revealed that PRL had accumulated losses of Rs 21.80 lakhs on running the canteen. The losses of Rs 21.80 lakhs were incurred despite additional income of Rs 8.43 lakhs earned by canteen during 1989-93 by serving at official parties.

In December 1990, PRL opened an expenditure head 'staff welfare expenses' under 'office expenses' to meet the canteen deficit with the approval of MC in January 1989. MC also accorded approval to write off canteen deficit of Rs 2.54 lakhs incurred during 1983-88. On the basis of this decision, all the assets and liabilities of the canteen

including deficit of canteen upto 31 March 1989 were transferred to PRL account. PRL had written off the canteen losses of Rs 3.08 lakhs incurred during 1983-89.

While approving the write off of canteen losses in January 1989, MC expressed the need for review of the prices of the items on annual basis to match the costing of items served in the canteen. MC was informed in July 1991 that the prices of the items had been increased on the basis of the actual costing of items. As losses had persisted thereafter also, obviously information given to MC was not entirely correct.

Further, PRL had given hidden subsidy to the canteen every year by creating the sub-head of expenditure 'staff welfare expenses' under 'office expenses' to meet the deficit of canteen on year to year basis and transferring all the assets and liabilities of canteen to PRL accounts. The canteen account was required to be maintained separately on 'no profit no loss' basis.

(iv) Conveyance allowance

PRL had incurred an expenditure of Rs 3.54 lakhs towards payment of conveyance allowance to 216 employees during the period November 1986 to March 1993 though no provision for payment of conveyance allowance existed.

10.2 Injudicious import of refrasil cloth

ISROSIL, a high silica cloth, was developed by Vikram Sarabhai Space Centre (VSSC) as an import substitute for 'refrasil' cloth, a material mainly used in thermal protection and insulation for rocket nozzles. For the technology transfer and buy back of ISROSIL, an agreement was entered into by VSSC with a firm in May 1984.

As per the agreement, 30000 square metres of ISROSIL was to be purchased by VSSC during 1984-88. Three orders were placed by VSSC during 1985-88 and five orders during 1988-92 for supply of 12000 and 14500 metres of ISROSIL respectively.

The supplies from a firm 'P' ranged between 250 metres to 300 metres per month on an average. However, it was felt in July 1988 that supply of 1200 metres of ISROSIL was required every month and as the capacity of the firm 'P' to meet the

full requirement was considered doubtful, it was decided in July 1988 to import refrasil cloth. Accordingly, 8230 metres of refrasil cloth even after having a stock of 6143 metres was imported at a cost of Rs 29.39 lakhs from another firm 'Q' in January 1989.

During the years 1988-93, 3799 metres refrasil cloth was issued. Thus, the import resulted in avoidable expenditure in foreign exchange to the tune of Rs 29.39 lakhs.

Even after having imported 8230 metres of refrasil cloth and after requirement of silica cloth had reduced due to change in design and curtailment of tests, three orders were placed by VSSC on firm 'P' during November 1990 - August 1991 for procurement of 7500 sq metres of ISROSIL, against which the firm supplied 7470 sq metres at a cost of Rs 42.95 lakhs although the requirement of this material could have been met from the stock of 10573 metres of indigenously made and imported refrasil cloth. Thus, procurement was repeatedly made without reference to stock position and without assessing the requirement realistically keeping in view the design changes in the nozzle.

While accepting the facts, Department of Space stated in December 1993 that in a R&D activity of high-tech and strategic area it was difficult to plan procurement of materials as in an industry. As quantity stockpiled was substantial, some mechanism needs to be evolved to avoid unplanned stocking of material.

In sum, in the absence of proper procurement planning, an extra expenditure of Rs 72.34 lakhs including Rs 29.39 lakhs in foreign exchange component was incurred.

10.3 Blocking of capital on unutilised steel

The Vikram Sarabhai Space Centre (VSSC) had a stock of 37.42 tonnes of 15 CDV 6 steel forged square blooms in various sizes as of 31 December 1988. Nevertheless, VSSC procured 266.65 tonnes of the same stores in different sizes at a total cost of Rs 167.36 lakhs during January 1989 to August 1993, in anticipation of sanction of the Department of Space (DOS), for Geosynchronous Launch Vehicle (GSLV) under the pre-project activity of GSLV. VSSC had also received 2.73 tonnes stores from other sources. The total issues amounted to 146.43 tonnes during the same period out of which 43.76

tonnes were issued for ASLV and consumption of blooms even after the sanction of GSLV in November 1990 and subsequent accelerated GSLV activities had not exceeded 102.67 tonnes.

Thus, out of the total procurement of 266.65 tonnes of blooms, 160.37 tonnes (60 *percent*) were in excess of the requirement and held in stock as of August 1993.

VSSC admitted (September 1992/July 1993) the holding of excessive stock and attributed the same to the change in configuration of GSLV in 1990-91, curtailment of flights planned under the GSLV pre-project activity and the lead time of two years required to complete the production basis of these blooms. But, the lead time ranging between 20 and 24 weeks provided in the order itself disproves that the lead time of two years was required.

DOS stated in February 1994 that the balance quantity would be utilised in the programmes which were likely to be sanctioned shortly. It was also stated that these blooms do not have any shelf life and hence can be stored safely for meeting future launch vehicle requirements.

The case shows that failure to make a realistic assessment of anticipated requirement of stores resulted in blocking of capital of Rs 100.50 lakhs.

10.4 Injudicious placement of order

The Vikram Sarabhai Space Centre (VSSC), Trivandrum placed an order in February 1989 on a US firm 'R' for import of a vibration control system SD-1201 at a cost of US $ 76298 (Rs 15.56 lakhs). Considering the uncertainties in getting the export licence from US Government, VSSC decided to process a stand-by indent for an industrial type random vibration console without shock test capability. The order placed on the US firm was cancelled in October 1989. However, the firm's Indian representatives informed VSSC in November 1989 that US Government had delicenced the system and the order could be executed within 120 days from receipt of letter of credit.

Order on the firm 'R' was not reinstated and instead orders were placed on UK and French firms 'S' and 'T' for procurement of stand-by stores at the cost of pounds sterling 19165 and FF 4500 and spares at pounds sterling

3100 and another order was placed on firm 'R' subsequently in November 1990 for supply of sine/random control system at a cost of US $ 75000 (Rs 15.36 lakhs) stating that the industrial type random vibration console ordered in January/February 1990 would not meet the shock test option requirement of the division.

Non-restoration of the cancelled order on the US firm immediately after receipt of intimation in November 1989 that the US Government had lifted the restrictions and placement of order on the other firms resulted in avoidable expenditure in foreign exchange to the tune of Rs 7.21 lakhs.

10.5 Avoidable expenditure due to defective purchase order

An order was placed on a firm by the Vikram Sarabhai Space Centre **(VSSC)**, Trivandrum in June 1988 for fabrication and supply of six assemblies of Reactor control system **(RCS)** and SITVC aft shroud structures required for Polar Satellite Launch Vehicle **(PSLV)** at a cost of Rs 66 lakhs.

As the work order was for development and fabrication, subsequent modifications in the orders, because of changing design/material, had been anticipated and the firm had agreed (May 1988), during price negotiations, to absorb the cost of any likely modifications within the price quoted. However, this stipulation was not incorporated in the purchase order nor was any provision made to the effect that work on fabrication of subsequent assemblies should be undertaken only after acceptance of the first assembly.

During trial integration of the first assembly, which was delivered in March 1989, certain modifications were found essential. By the time the modifications were pointed out in July 1989, considerable progress had been made on the remaining assemblies and as a result 305 components were rejected necessitating re-work in 26 components, fresh fabrication of 99 components and deletion of 70 old components from the scope of work. The firm had sought a compensation of Rs 19.80 lakhs for the modifications but agreed to reduce it to Rs 14.34 lakhs. Of this, a sum of Rs 3 lakhs was paid towards the fabrication cost of the 305 finished/semi-finished components which were rejected.

The Project authorities stated in August 1993 that the accommodation of the modifications within the quoted price mentioned in the firm's offer were meant only for minor modifications and admitted that it was an omission of the Project to exclude the word 'development' in the description of the order. But, the firm's offer had covered all modifications within the quoted price in unambiguous terms.

CHAPTER XI

Indian Council of Agricultural Research

(Department of Agricultural Research and Education)

11.1 Jute Technological Research Laboratories

11.1.1 Introduction

Jute Technological Research Laboratories (JTRL) was established in 1939 by Government of India and in 1965 it was taken over by the Indian Council of Agricultural Research (ICAR). The main objective of JTRL is to carry out technological research on jute and other long vegetable fibres for improving fibre quality and diversification of end use.

11.1.2 Scope of audit

JTRL 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 JTRL for the period 1988-93.

11.1.3 Highlights

- **Sub-stations in Andhra Pradesh, Assam, Bihar and Uttar Pradesh as suggested by Quinquennial Review Team (QRT) had not been set up yet. Management Committee did not sit regularly as provided for in the bye-laws of ICAR and participation of outside experts was poor. Recommendation of QRT for inclusion of two members representing jute technology user sector had not been implemented.**

  (Para 11.1.4)

- **Mechanism of manpower utilisation was not sound. Number of projects taken up were low as compared to the scientific manpower available.**

  (Para 11.1.6)

- **Mechanism for monitoring and evaluation of results of research in JTRL was poor. Staff Research Council (SRC)**

did not meet regularly and minutes of meeting were not recorded properly.

Research identification and planning was done as an in-house exercise with which public and private sector bodies having interest in jute technology were not associated. As a result, the research results could not find their way to the industries. QRT recommended constitution of Research Advisory Council (RAC) with experts from industry and other research institutions for formulation of research policies and identification of research projects. The recommendation had not yet been implemented.

No patent had been filed since 1977 and no technology was developed during 1988-93.

Out of 29 technologies developed by JTRL since inception, only eight could be transferred to private parties and entrepreneurs and that too, through informal interactions of published literature.

A sponsored project was taken up long after receipt of funds. Records about sponsored projects were not made available to Audit.

(Para 11.1.7)

Cases of equipments purchased for sponsored projects long after the projects were completed, equipments purchased not installed long after procurement due to faulty planning, equipments procured with different specification from that mentioned in the tender enquiry resulting in unintended benefit to the supplier and installation charges paid extra though the purchase order provided for free installation came to notice during test-check.

(Para 11.1.8)

11.1.4 Organisational set up:

The research and development (R&D) activities of JTRL are conducted through four divisions viz.

- Textile and non-woven technology,

- Chemical technology,

- Chemistry and microbiology and

- Physics and physical testing including raw jute grading section.

Quinquennial Review Team (QRT) in their report for the period 1982-86 recommended (1988) setting up of sub-stations in Andhra Pradesh, Assam, Bihar, Orissa and Uttar Pradesh to cater to the needs of entrepreneurs from all over the country for quality evaluation of jute, mesta and related crops and also transfer of technology developed by JTRL. But only one regional centre in Orissa has been established so far (November 1992).

JTRL has a Management Committee (MC) to assist the Director. MC mainly considers matters relating to administration and also evaluates progress of research, mostly on the basis of verbal presentation made by scientists present in the meeting. Though scheduled to meet once in each quarter of a financial year, MC met only once or twice a year during the period 1988-93. The attendance of outside experts was very thin and MC had almost assumed the shape of an internal committee. QRT had suggested inclusion of two members representing jute technology user sector, but this was yet to be implemented.

11.1.5 Income and expenditure

JTRL is financed through grants from ICAR. Financial assistance received from ICAR, revenue earned from own sources and expenditure for the period 1988-93 are shown below:

Year	Income		Expenditure			
	Grants from ICAR	Other receipts	Establish-ment charges	Other con-tingent expenditure	Acquiring assets	Total
			(Rs in lakhs)			
1988-89	109.03	0.24	63.58	21.86	11.97	97.41
1989-90	171.49	0.81	86.82	20.31	51.37	158.50
1990-91	136.85	2.53	81.62	25.28	35.56	142.46
1991-92	210.51	0.89	87.24	25.00	80.48	192.72
1992-93	220.89	1.11	104.21	30.59	11.68	146.48

11.1.6 Manpower

Men in position vis-a-vis sanctioned strength during 1988-93 was as detailed below:

Category	Sanctioned strength	Men-in-position				
		1988-89	1989-90	1990-91	1991-92	1992-93
Scientific	61	34	35	37	36	38
Technical	67	57	57	59	59	59
	128	91	92	96	95	97
Others:						
Administrative	40	35	35	35	35	38
Auxiliary	20	16	18	18	17	16
Supporting	56	52	50	47	48	48
	116	103	103	100	100	102

Though as per ICAR guidelines a scientist is not to be involved in more than three projects at a time, some scientists in JTRL were sometimes involved during 1988-93 in nine to eleven projects. Moreover, the number of scientific personnel varied from 34 to 38 during 1988-93 whereas number of projects taken up during the five years was only 39. Thus, the mechanism of manpower utilisation in JTRL was not sound.

11.1.7 Research activities

R&D activities of JTRL were carried out through in-house projects, projects funded by external agencies, internal institutional projects and all India coordinated research projects on jute and allied fibres.

Monitoring of projects

Monitoring and evaluation of projects was mainly done through a Staff Research Council (SRC) i.e. an internal committee represented by the scientists of the laboratory only. No records relating to formation and functions of SRC were made available to Audit though asked for. As per

directives of ICAR, SRC was to meet twice a year. However, during the five years (1988-93) SRC met only five times. The proceedings of the meetings were not minuted and the decisions taken in these meetings were not circulated to those concerned, with follow up action.

Besides SRC, performance of JTRL was to be reviewed by QRT set up by ICAR once in every five years. No QRT has been formed since 1987.

Thus, monitoring and evaluation arrangements in JTRL were ineffective/defunct.

ICAR stated in February 1994 that attention would be paid to maintaining the records systematically.

Research identification and planning process

Identification of research projects in JTRL was a routine matter. The projects were undertaken without inviting outside experts' comments. QRT had recommended in its report for the period 1982-86 constitution of a Research Advisory Committee (RAC), with experts from industry and other research institutions, with the responsibility of formulation of research policies and identification of research projects. This committee had not been constituted. As a result, projects were not identified after ascertaining whether research results would be helpful to the industry. There was no linkage, for transfer of technology and exchange of information with user industries, other related R&D organisations, extension agencies and government departments.

In-house research projects

The in-house projects undertaken, completed and terminated during 1988-93 were as follows:

Year	Opening balance	Projects taken up	Projects completed	Projects terminated	Closing balance
1988	18	12	6	1	23
1989-90 (Jan 1989 to March 1990)	23	1	12	-	12

1990-91	12	13	3	-	22
1991-92	22	8	2	-	28
1992-93	28	5	6	-	27

The projects were extended beyond their targeted dates of completion without assigning any reasons for such extensions. JTRL stated (June 1993) that the projects were extended after discussions in SRC.

Dissemination of research results

Lab-to-land programmes, transfer of technologies and publication of papers are the ways for dissemination of research results. It was seen that no technology was developed during the period under review (1988-93), no technology was patented since 1977 and no research results were disseminated to farmers through lab-to-land programmes and to industry through transfer of technology. Even the technologies developed long ago were yet to be transferred to the industry. Whatever technologies reached the users were not formally transferred but was the result of informal interaction or published literature. The user industries have their own R&D units and there are public and private sector bodies viz. Indian Jute Industries Research Association, Central Research Institute for Jute and Allied Fibres, Jute Manufacturers Development Centre etc. working in the same direction. Therefore, unless the technology developed was patented and transferred, the practical utility of research outcome of JTRL could not be assessed, and overlapping of research work in JTRL and other bodies could not be ruled out.

QRT in its report for the period 1982-86 stated that the progress of research had remained static. While accepting the facts, JTRL stated (June 1993) that work was done to further modify and simplify the technologies already developed to suit the changing need and availability of resources. The fact remains that during 1988-93 JTRL had not developed any technology either for farmers or for the industry.

Since inception, JTRL had developed 29 technologies but only eight were transferred to private parties and entrepreneurs. The precise terms and conditions on which the technologies were transferred and royalty earned, if any, were not made available to Audit. JTRL stated (July 1993) that some

technologies were utilised for their research findings published and presented in different fora. ICAR stated in February 1994 that transfer of some of the remaining technologies developed by JTRL was in progress.

JTRL had published 178 papers during 1986-91 (48 in 1986, 41 in 1987, 25 in 1988, 25 in 1989-90 and 39 in 1990-91). Some of these published papers were on subjects not related to jute. Information for the years 1991-93 was yet to be compiled and not furnished to Audit.

Sponsored projects

JTRL undertook the following four projects sponsored during 1988-93 by the Ministry of Textiles from the Special Jute Development Fund:

- studies of yellowing properties of bleached and dyed jute and jute products and its remedies,

- development of pilot plant for production of fungal culture for upgrading low quality barky jute,

- development of jute based non-woven and geotextiles for various industrial and consumer products, and

- pilot plant studies of texturisation of jute for commercial development of low price high quality.

The above projects could not be adequately evaluated in Audit on account of JTRL's failure to make available all the relevant records.

There was inordinate delay in taking up the project: 'Development of pilot plant for production of fungal culture for upgrading low quantity barky jute'. The pilot plant project was taken up only in November 1992 even though the Ministry of Agriculture had sanctioned Rs 5 lakhs in January 1990 for this purpose and Ministry of Textiles had conveyed acceptance of the programmes in November 1989 itself. The amount of Rs 5 lakhs remained idle with ICAR and was made available only in March 1993.

Besides, the Annual Report of JTRL for the year 1990-91 highlighted that it had run some projects sponsored by Department of Posts, Government of India and International

Jute Organisation but no records were made available to Audit to verify and evaluate the work done on these projects.

11.1.8 Purchase of stores

JTRL had discontinued the practice of purchase of stores through Directorate General of Supplies and Disposal as per policy decision of ICAR based on the recommendation of the Scientific Advisory Committee. ICAR constituted a committee with a view to evolving suitable revised store purchase procedure which had submitted its recommendations. Pending finalisation of the purchase manual, purchase was being effected as per recommendations of this committee.

A scrutiny of some of the purchase cases revealed as follows:

- Orders for import of equipments were placed on CIF basis whereas these were required to be placed on FOB basis.

- Proprietary article certificate (PAC) furnished by the supplier formed the basis of purchase as against the requirement that such a certificate from the indenter only was valid.

- There were long delays in checking the contents of the consignments after receipt.

- Installation and commissioning of equipment was delayed on account of non-provisioning for pre-installation/ pre-commissioning requirements.

- Technical particulars of the equipments indented were not examined by an authority competent to evaluate technical suitability and soundness of the equipment but were identified by the indenting scientists merely on the basis of quotations and PACs furnished by the Indian agents of the foreign suppliers.

- Technical particulars of equipments were substantially changed and terms of orders materially varied at the instance of the supplier after placement of the orders.

- Risk purchases at the cost and risk of the defaulters were not resorted to, and on a firm's failure to execute the purchase order, order was placed on the next higher tenderer notwithstanding the fact that the equipment offered was technically different.

Some illustrations are mentioned below:

(a) Inductivity coupled spectrophotometer (ICP)

JTRL purchased one ICP from a foreign firm in Australia for Rs 21.93 lakhs (CIF value US $ 0.70 lakh), for use in a sponsored project financed by the Ministry of Textiles, out of the Special Jute Development Fund and scheduled to be completed in October 1992. Purchase order was placed in December 1989 and the consignment was received in JTRL in March 1992 but the contents of the consignment were checked by the representatives of the Indian agent only in February 1993. Though the Indian agent of the foreign supplier intimated as far back as in May 1992 that argon gas and fume extraction hood arrangement were pre-installation requisites and were required for operation of the equipment, orders for them with local firms were placed only in January 1993 and February 1993. JTRL did not indicate whether the argon gas and fume extracts hood arrangement had been received. The equipment was still to be installed and put to use, though the project, for which the equipment was procured, was closed in November 1992.

Thus, due to faulty procurement planning the equipment worth Rs 21.93 lakhs could not be utilised. It also needs to be clarified as to how the project could be completed without the dedicated equipment and whether purchase of the equipment was at all necessary.

(b) Special padmangle and two bath calender type hot press

JTRL invited open tenders for the following equipments for use in a sponsored project financed by the Ministry of Textiles:

- special padmangle impregnation and immersion with a working width of 600 mm, and

- calender type hot press suitable for thermal bonding of non-woven fabrics consisting of two rolls with width of 700 mm and working width of 600 mm.

As per tender enquiry the equipments were to be supplied completed in all respects with necessary spares and provision for training, installation, demonstration and warranty. Only one firm responded offering equipment as per the tender enquiry and quoting on CIF basis. Order was placed in December 1989 for S Fr 2.27 lakhs which covered the cost of visit, inspection of the machinery and training of the personnel. The firm intimated in January 1990 that they had inadvertently quoted for equipment having a roller width of 700 mm corresponding to a working width of 600 mm and they could supply one having a roller width of 600 mm only corresponding to a working width of 550 mm. JTRL intimated (March 1990) that this width would serve their purpose. The consignment was received in March 1991. On the firm's demand, a further amount of S Fr 0.05 lakh was paid towards services of expert for erection and commissioning of the equipment which was installed in June 1991. Thus, there was a material variation in roller width of the equipment from what was stated in the tender enquiry and it was readily accepted by JTRL, instead of going in for re-tender either with the original specifications at the cost and risk of the defaulter or for getting competitive rates for the revised specifications. Further, supplier's plea for payment of S Fr 0.05 lakh (Rs 0.81 lakh) for rendering services was accepted though the tender enquiry and purchase order provided for free services. Total cost involved in the purchase was Rs 37.03 lakhs.

(c) Programmable refrigerated centrifuge

JTRL invited tenders in September 1989 for a programmable refrigerated centrifuge for use in the study of solubility behaviour of cellulose derivatives in various solvents, resin cross linking of jute fabrics and analysis of carbohydrates and its derivatives. As per specifications mentioned in the tender enquiry the equipment was to have storable programme, brushless induction meter and maximum g-force of 60000. Of the nine quotations received, the lowest offer for model JK401 microprocessor offered by the Indian agent of the foreign supplier in Germany was accepted. As the firm could not supply the instrument as per specification, the order was cancelled. The second lowest

tenderer agreed to extend the date of validity and order was placed in February 1991 for US $ 25776 in spite of the fact that the model offered by them did not contain storable programme and brushless drive and had a maximum g-force of 49060. As the specification varied significantly, JTRL should have gone in for retendering. The equipment costing Rs 8.53 lakhs was received in July 1991. But the same could not be installed as the 32 ampere electric connection required for installation of the equipment was not available in JTRL. Two spare parts were received in defective condition which were replaced in July 1992. The equipment could be installed in September 1992.

Thus, the instrument procured was not as per specification mentioned in the tender enquiry and the installation was delayed by a year due to inability of JTRL to provide the necessary infrastructure. There was no indication on record about the utilisation of the equipment.

(d) Cahn micro-balance

JTRL placed purchase order in March 1989 for one automatic micro-balance for a project sponsored by the Ministry of Textiles at a cost of US $ 8595 (Rs 1.46 lakhs). The equipment was considered a proprietary article on the basis of a certificate produced by the manufacturer. The equipment was received in November 1989 but could be commissioned only in August 1990 because of delay in making the infrastructure ready.

While accepting the facts, ICAR stated in February 1994 that there was some delay in procuring the equipment for the sponsored projects due to administrative and some technical problems. It was also stated that sometimes installation of equipment is delayed due to non-availability of requisite stores and other facilities.

11.1.9 Instruments developed by JTRL

JTRL had developed some instruments having possible utility in research and teaching institutions and other industries. While reviewing performance of JTRL for the period 1982-86, QRT had recommended that the instruments having utility in teaching and research institutions may be continued to be fabricated by JTRL with appropriate quality control whereas instruments of wider utility need be productionised through

identification of commercial ventures and entrepreneurs. Action in this regard was yet to be taken.

CHAPTER XII

Council of Scientific and Industrial Research

(Department of Scientific and Industrial Research)

12.1 Indian Institute of Chemical Biology

12.1.1 Introduction

The Indian Institute of Chemical Biology (IICB) was established as a constituent unit of the Council of Scientific and Industrial Research (CSIR) in 1956, to undertake research in basic biological sciences for seeking solution of medical problems yet unsolved, with emphasis on projects having a bearing on the current biological and medical needs of the country.

12.1.2 Scope of audit

IICB is audited under Section 20 (1) of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971. The present review in audit is based on test-check of transactions of IICB during 1985-93.

12.1.3 Management

The Director of IICB is assisted by a Research Council, a Management Council, an internal committee and other in-house committees.

As on April 1993, there were 285 scientific and technical personnel and 94 non-technical personnel in IICB against the sanctioned posts of 301 and 116 respectively.

12.1.4 Highlights

- **IICB is mainly funded by CSIR. Funds generated from outside agencies upto 1991-92 was a negligible percentage of the revenue expenditure. During 1992-93 also, it fell short of the target of 30 to 40 *percent*.**
  (Para 12.1.5)

- Evaluation and monitoring system prevailing in IICB was inadequate and review of progress of research was not done in most of the cases.

  None of the in-house projects was completed during 1985-93. All the in-house projects were renamed and regrouped from 1990-91 after their continuation for periods ranging from 5 to 11 years. Progress of research was not evaluated to ascertain how far the objectives were achieved.

  Three sub-projects were dropped after being continued for periods ranging from 8 to 11 years due to transfer of the investigator concerned. Expenditure incurred on these projects became infructuous.

  (Para 12.1.6)

- Out of the three completed sub-projects, research findings in respect of two though developed could not be utilised and in respect of the other two no finding was developed.

  Research programme of the project: 'Fertility Management', started in 1984, required revision to achieve the target, after an expenditure of Rs 196 lakhs.

  No know-how was developed during 1985-93 and 21 patents though filed were not processed further.

  (Para 12.1.7)

- Equipment worth Rs 12 lakhs received in February 1988 could not be utilised for the purpose for which it was procured for want of trained personnel.

  Sixty six items of different kinds of stores received during 1985-93 were awaiting inspection and accounting in the stock register.

  (Para 12.1.9)

- Adjustment/settlement of discrepancies of Rs 120 lakhs reflected in the bank reconciliation statement of February 1993 was pending, some of which related to periods as far back as 1971-72.

  (Para 12.1.11)

12.1.5 Receipt and expenditure

The funds provided to IICB comprise essentially of grants given by CSIR which amounted to Rs 3031.50 lakhs during 1987-93. Besides, IICB's other receipts on account of own resources, deposits of grants-in-aid/consultancy projects etc. amounted to Rs 216.40 lakhs during the same period. Expenditure during this period was Rs 3028.56 lakhs.

Percentage of funds generated from outside agencies ranged from 2.98 to 7.02 of the revenue expenditure during 1987-92 which was far below the target (30 to 40 *percent* of revenue expenditure) as fixed by CSIR. However, it increased to 27 *percent* in 1992-93.

CSIR stated in February 1994 that IICB being a basic research institute could not significantly generate extra-budgetary resources before 1992-93.

12.1.6 Research projects

Planning, execution and monitoring

The functions of Research Advisory Council, which was replaced in 1988 by Research Council, of IICB are to advise and recommend on formulation of research programmes, conduct periodic reviews of the research activities and assess their progress. IICB had 43 projects in 1989-90 and 48 in 1991-92. But, RC at its meetings held during 1988-92 reviewed only two projects leaving most of the projects unreviewed. Each institute/laboratory of CSIR was required to set up a project monitoring and evaluation (PME) cell as a focal point for implementation of the process of project budgeting etc. Reports were required to be periodically submitted to the internal committee and to the project leader for taking remedial measures, if necessary. But no such report of physical progress of the projects was prepared by the PME cell and the internal monitoring committee was not formed. Thus, the evaluation and monitoring system prevailing in IICB was inadequate.

Position of projects undertaken during the period 1985-93 was as follows:

	1985-86	86-87	87-88	88-89	89-90	90-91	91-92	92-93
Carried forward:	45	45	45	45	43	43	48	46
Taken up:	-	-	-	-	-	4	-	-
Terminated:	-	-	-	(2)	-	(1)	(2)	-
Ongoing:	45	45	45	43	43	48	46	46

Projects were continued from year to year as a matter of routine. The projects were further regrouped in 1990-91 and renamed and reclassified into 11 projects involving 37 sub-projects on the ground that these did not yield the desired results.

These projects had existed for periods ranging from 5 to 11 years and expenditure of Rs 708.46 lakhs had been incurred on them. But, their further continuation was not determined on the basis of proper and regular review and monitoring. Periodical review by the Director General, CSIR contemplated in the decision taken by the CSIR society in February 1988, was also not done. Results received till renaming, regrouping and reclassification of these projects were not evaluated properly and reasons for shortfalls in targets and achievements were not identified and analysed.

CSIR stated in February 1994 that in basic research all over the world certain project areas continued for decades and this was applicable to the IICB projects also. Because of non-maintenance of project-wise accounts, CSIR could not confirm the extent of expenditure incurred on these projects.

Sponsored projects

Only two sponsored projects were undertaken by IICB and completed by 1988 and none thereafter. The technology developed had not acquired practical utility and IICB did not get any more sponsored projects. The details of the two projects were as follows:

(a) The project: 'Research and development-cum-pilot production of quinine to quinidine chemically', sponsored by the Department of Commerce and Industries, Government of West Bengal, was taken up in April 1982 and was completed in March 1986 at an expenditure of Rs 4.28 lakhs. The technology developed under this project was transferred to the sponsor in May 1987. But, production of quinidine with

the technology so transferred to them was yet to start. The reasons for non-utilisation of this technology were not known to IICB.

CSIR stated in February 1994 that West Bengal Government had failed to initiate measures to scale up and transfer technology developed at IICB. It was also stated that unless they were interested nothing could be done and the Institute was trying to activate them.

(b) The project: 'Biohydrometallurgical extraction of copper from low and margin grades of sulphide ores' sponsored by a public sector undertaking was taken up in April 1985 and was completed in March 1988 at an expenditure of Rs 5.24 lakhs. IICB was requested to work with low grade ores from Ghatshila region, but the ore so supplied for biohydraulic extraction was found unsuitable for this method. The strains developed could not extract copper from this ore at an economical rate. As a result, the strains were not accepted by the sponsor and these were still lying with IICB.

CSIR stated in February 1994 that the gap in generation of know-how and actual commercialisation was due to lack of upscaling facilities in the Institute.

Thrust area projects

Three in-house projects viz. **(a)** Medicinal chemistry and biotechnology of natural products, **(b)** Molecular biology of parasite, leishmania donovani and chemotherapy of leishmaniasis and **(c)** Molecular biology of vibrio cholera and its implications in immunoprophylaxis were identified as thrust area projects in the Seventh Plan. These projects were taken up in April 1981, April 1982 and April 1984 respectively and after continuing them upto 1989-90 and incurring expenditure of Rs 304.30 lakhs these were regrouped and renamed. IICB stated in October 1992 that during the Seventh Plan, expertise in molecular biology, radio and enzyme-linked immuno-assay techniques, tissue culture and hydridoma technology, and recombinant DNA technology was substantially increased and the expertise generated would be of significant help in raising the quality of research during the Eighth Plan period.

Grants-in-aid **(GIA)** projects taken up and completed during the years 1985-93 were as detailed below:

	1985-86	86-87	87-88	88-89	89-90	90-91	91-92	92-93
Number of projects carried	-	-	4	5	9	9	12	14
Number of projects taken up	-	4	1	4	-	4	7	6
Number of projects completed	-	-	-	-	-	1	5	-
Number of projects in hand	-	4	5	9	9	12	14	20

IICB undertook 26 GIA projects during 1985-93, out of which six projects were completed. The final report on a project: 'Molecular mechanisms of catalysis' completed in November 1991, was submitted in December 1992 after delay of over one year. A sum of Rs 4.26 lakhs was still outstanding from the funding agencies in respect of four projects which were completed during the period October 1990 to April 1992. IICB had no mechanism to get feedback from the funding agency for use of research findings, technologies developed under the projects, so as to know the shortcomings in the practical uses of their research findings for further research and development.

CSIR stated in February 1994 that the Institute had since received the contracted amounts from the funding agencies.

Termination of projects

Three projects in existence for periods ranging from 8 to 11 years were dropped due to transfer of the investigators of the projects rendering the expenditure incurred infructuous. Because of failure to maintain sub-project-wise expenditure, the extent of infructuous expenditure could not be quantified.

12.1.7 Results of research

The sub-project: 'Development of biotechnology for the saccharification of polysaccharide reserves of agro-residues' was taken up in April 1985 with the objective of

developing suitable process technology for the enzymatic saccharification of constituent polysaccharides of agro-biomass. Though the sub-project was completed in March 1990, its findings had not been utilised so far. IICB stated that utilisation of the research result of the sub-project needs further research.

Another sub-project was taken up in April 1985. The objective of the sub-project was to contribute to immuno-haematology and forensic science. But, no research findings had been developed from the completed sub-project.

Thus, research findings in respect of two completed sub-projects were developed but not utilised and research findings in respect of one sub-project was not developed. Consequently, expenditure incurred on this project as a whole did not yield any results. IICB stated in August 1993 that though the programme of work on sub-projects was completed, they were taken up again in projects regrouped later.

Yet another sub-project: 'Search for fertility regulating agents from natural sources and other related studies' under the project: 'Fertility management/reproductive biology' was taken up in April 1984 and was scheduled to be completed in March 1987. The objective of the project was to design and develop male and female contraceptives and advancement of knowledge in the field of fertility management.

Research Council (RC) of IICB had advised in October 1986, after consultations with the appropriate agencies in the Ministry of Health and Family Planning and the Indian Council of Medical Research, on usefulness of betaine for human contraception. But, this was not followed up by IICB. Planning division of CSIR had also pointed out in August 1988 that the work on fertility regulation did not yield significant leads. Further, RC in its meetings held during August 1988 to March 1993 had stressed on goal-oriented perspective plan for achieving the objectives of the project. This was also not done.

Expenditure of Rs 195.42 lakhs incurred during 1985-93 remained unproductive on account of lack of proper action.

CSIR stated in February 1994 that a comprehensive perspective plan was under the review of RC.

The position of **know-how developed and patent filed** by IICB during 1985-93 was as follows:

	1985-86	86-87	87-88	88-89	89-90	90-91	91-92	92-93
Know-how developed:	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Patent filed:	1	5	2	1	3	6	1	2

During the years 1985-93, no know-how was developed by IICB. However, 21 patents were filed during this period but not a single patent was processed further and developed for commercialisation. Thus, the very objective of IICB i.e. seeking solution to unsolved medical problems was yet to be realised.

CSIR stated in February 1994 that due to lack of facilities, commercialisation of patents filed by the Institutes required upscaling by entrepreneurs and that the Institute was publicizing the patents to potential takers.

12.1.8 Publications

Compared to 1987-88 the number of papers published had declined during the years 1988-89 to 1990-91 despite increase in the number of scientists. The details were as shown below:

Particulars	1987-88	88-89	89-90	90-91	91-92	92-93
Papers published	77	72	60	70	79	86
Number of scientists engaged	103	109	114	118	119	126

12.1.9 Purchase and stores

Rationalised purchase procedure prescribed by CSIR in 1988 provided that for procurement of items which were needed frequently viz. general chemicals, solvents, glassware etc.

a standing purchase committee should be constituted which would process the procurement of each such item after studying the data bank for the relevant items. But, it was not followed and the chemical items were procured frequently on verbal orders without observing the necessary purchase formalities i.e. inviting quotation, placing of formal purchase order etc. Data bank of the chemicals had also not been prepared.

It was noticed in test-check that chemicals worth Rs 1.38 lakhs were procured on verbal orders. As a result, it could not be verified whether the rate at which the chemicals were purchased, was competitive and economical.

CSIR stated in February 1994 that the concerned firms were 'on manufacturing' rate contracts with the Laboratory and allowed discounts on their catalogue prices. As regards data bank of the chemicals it was stated that it was now being maintained by the project group leader.

Idle equipment

(i) In November 1991, IICB invited quotation from five firms for supply of a spectrophotometer and their offers were scrutinised by the indenter. One of the scientists of IICB recommended procurement of a 'Shimudzu' spectrophotometer and accordingly purchase order was placed with a Singapore based firm in January 1992 at a cost of Rs 4.51 lakhs. Sanction for procurement of the instrument was obtained only in February 1992 i.e. after issue of the purchase order. The equipment was received in May 1992. Thus, the purchase order was finalised by officer not authorised to do so and without sanction.

IICB stated (August 1993) that all purchase cases, except cases requiring more careful consideration, were not placed before the purchase committee. This policy was adopted to allow the scientists to devote maximum time for research work. This is not tenable as IICB was not competent to make a departure from the procedure prescribed by CSIR.

CSIR stated in February 1994 that the sanction for procurement of the instrument was obtained in January 1992 and it was, however, recorded as February 1992 inadvertently. This was at variance with IICB's response of August 1993.

(ii) IICB procured two micro-vax computers alongwith a graphic work station at a total cost of Rs 12.42 lakhs from a foreign firm. Both the computers were received in February 1988 and installed in October 1988.

The computers were procured for bio-physics, nuclear magnetic resonance (NMR) and theoretical biology divisions; scientists involved in these groups would do molecular energy calculation and analyse the conformal dynamics. The purpose was to derive sufficient information to solve the conformations of the molecule to analyse the small proteins through the micro-vax. The log book maintained for these computers did not indicate utilisation of the computers for the purpose for which these were procured. IICB stated (August 1993) that the micro-vax systems were mini-computer systems that required trained personnel for programming and operations. Due to paucity of funds, no specialised staff was recruited or specifically trained in biophysics, theoretical biology or NMR applications on the micro-vax. Thus, because of defective planning and improper assessment of available resources, expenditure of Rs 12.42 lakhs was incurred on procurement of equipment which had remained idle for nearly five years due to lack of trained personnel in micro-vax computer programming. The existing personnel of the computer division also could not utilise these computers.

CSIR stated in February 1994 that log books were since being maintained properly.

(iii) IICB procured one 'Farrand' System-3 scanning spectrofluriometer with programmable centre from a foreign firm at a cost of Rs 3.01 lakhs in March 1985 for providing infrastructural instrumentation facilities to the scientists in measuring the fluorescence effect of bio-organic samples.

The main instrument was installed in August 1987 after a lapse of over two years but the computer part of the instrument worth Rs 0.77 lakh had not been installed till date. The warranty period of the machine was one year and had long expired. IICB stated (July 1993) that agency commission (Rs 0.28 lakh) had been held up and complete installation of the total system was not possible due to inherent defect in the data interface. Thus, the expenditure

of Rs 3.01 lakhs had remained unproductive for over eight years.

CSIR stated in February 1994 that the Institute was making efforts to get the spares from the Indian agent of the foreign firm to make the equipment fully operative.

(iv) CSIR had prescribed the procedure to be followed for expeditious and systematic receipt, inspection and accounting of various stores. But, IICB did not follow the procedure and as a result huge quantities of **stores remained uncertified and unaccounted for** since 1985-86. Following instances were noticed in test-check in audit:

(a) Sixty six items of different kinds of stores procured during 1985-93 were awaiting inspection by the concerned indenting divisions. As a result, these stores were lying idle for over eight years. Cost of such stores was not furnished to Audit though asked for.

CSIR stated in February 1994 that action had been initiated to account for these items in the stock ledgers and issue the materials to indenters.

(b) Consequent on merger of one centre of Central Scientific Instrument Organisation, Calcutta with IICB in the year 1988, assets worth Rs 4.65 lakhs were transferred to the latter , out of which stores worth Rs 3.89 lakhs only were shown in the balance sheet of the Institute as at 31 March 1993. The remaining stores were yet to be accounted for.

Demurrage and wharfage charges.

As per CSIR's instructions, expenditure on demurrage and wharfage charges exceeding Rs 250 was required to be reported to CSIR. IICB had incurred expenditure of Rs 2 lakhs during 1985-93 on account of demurrage in 135 cases of imported consignments but did not report them to CSIR.

12.1.10 Physical verification

Physical verification of stores was last conducted partly in 1989. CSIR stated in February 1994 that a committee had been constituted for conducting 100 *percent* physical verification of stores.

12.1.11 Accounts

Advance payments amounting to Rs 315.75 lakhs made to the officials, private parties and government departments towards travelling allowance, purchase of materials etc. were outstanding as on 31 March 1993 as shown below:

	Amount lying with				Advance for supplies of stores
	Officials	Private parties	Govt. Deptt.	Local purchases	
			(Rs in lakhs)		
More than 5 years	0.14	35.16	8.62	0.63	25.43
Between 2 to 5 years	0.77	44.32	6.48	2.28	68.77
Upto 2 years	2.96	64.32	1.12	3.88	50.87
Total	3.87	143.80	16.22	6.79	145.07

Abstract asset register

IICB held assets worth Rs 1682 lakhs as on 31 March 1993. The figures exhibited in the balance sheet were not reconciled with the progressive total of the asset register. As per directives of CSIR, abstract asset register was to be maintained by every institute for reconciliation of the figures shown in the balance sheet with those of the asset register. But, it was not maintained and the progressive value of the assets shown in the accounts was not reconciled.

CSIR stated in February 1994 that figures were now being reconciled.

Bank reconciliation

IICB has a bank account with the State Bank of India. Bank reconciliation had been done upto February 1993 but some of

the discrepancies relating to periods going back to 1971 were yet to be settled.

	Items	Total amount	Period
		(Rs in lakhs)	
i)	Cheque issued but not encashed	22.41	July 1986 to February 1993.
ii)	Credit afforded by bank but not appeared in the cash book	41.45	August 1971 to February 1993.
iii)	Debit raised by bank but not appeared in cash book	54.07	April 1972 to February 1993
iv)	Cheque deposited but not entered in bank statement	0.51	September 1977 to February 1993.
v)	Book adjustment in cash but not entered in cash book	0.40	September 1973 to January 1988.
vi)	Difference	0.82	March 1984.

CSIR stated in February 1994 that bank reconciliation had been completed upto August 1993 and the Institute was making efforts to clear the outstanding debits/credits.

12.2. National Geophysical Research Institute

12.2.1 Introduction

The National Geophysical Research Institute (NGRI), Hyderabad was established in October 1961 to undertake research in methodology for geophysical exploration for oil, minerals and ground water.

NGRI is headed by a Director who is assisted by a Research Council (RC) and a Management Council (MC).

The functions of RC are to advise and recommend on formulation of research programmes, conduct periodic reviews of the research activities, assess progress of the research programmes, advise on future direction and fostering

linkages between NGRI and academic institutions, other research organisations, industry and potential clients. MC is responsible for administering and managing the affairs of the institute.

As on 31 March 1993, NGRI had 213 scientists, 483 technical personnel and 182 administrative and non-technical staff.

12.2.2 Scope of audit

NGRI is audited under Section 20(1) of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971. This review covers the activities of NGRI for the period 1988-93.

12.2.3 Receipt and expenditure

During 1988-93, NGRI received Rs 35.64 crores as grants from the Council of Scientific and Industrial Research (CSIR) and Rs 13.11 crores for sponsored projects. NGRI incurred an expenditure of Rs 35.63 crores during that period.

Guidelines for technology transfer and utilisation of CSIR knowledge base were revised in August 1989 with a view to reflect the cost incurred on the activities more realistically and NGRI was required to generate an external cash flow of 33.3 *percent* of its revenue expenditure on R&D by 1992-93. However, the external cash flow of NGRI for 1992-93 was below 14 *percent*.

12.2.4 Research projects

Research and development (R&D) activities of NGRI were conducted mainly through in-house projects and contract research comprising sponsored projects, grants-in-aid projects and consultancy projects.

In-house projects

The position of in-house research projects was as detailed below for the last five years:

	Number of projects		
Year	In hand	Completed	Terminated
1988-89	43	-	-

1989-90	47	18	3
1990-91	30	10	-
1991-92	20	2	-
1992-93	22	-	-

Thirty projects were completed during 1988-93 and three projects were short closed. In twenty projects there was delay upto three years in submission of final reports. On 10 projects no final reports had been submitted.

NGRI attributed (June 1993) the delay in submission of final reports to the project investigators being busy with the ongoing projects. It was also stated that the preparation of terminal reports was a scheme introduçed by them recently and the terminal reports were not being referred to experts for evaluation as CSIR had not laid down any rules or procedure to that effect. This indicates inadequate action towards utilisation of research results.

Short closure/suspension of projects

(i) To study the rate of convergence of the Indian continent with the Eurasian plate as well as to examine other inter-plate deformations within the Indo-Australian plate, NGRI proposed to set up a facility during the Eighth Plan programme of CSIR and an amount of Rs 10 crores was allocated for the purpose.

CSIR accorded approval for undertaking establishment of 'geodetic very long baseline interferometry' facility in January 1991. Installation and testing of equipment was to be completed within 30 months and the work observation of quasars within five years.

During 1990-91, Rs 1 crore was allotted. The work relating to antenna for observation of quasars was awarded to a firm on turnkey basis at a cost of Rs 5.10 crores and a sum of Rs 1.04 crores was paid to the firm in October 1991. An amount of Rs 40 lakhs was transferred to National Physical Laboratory for construction of a master clock required for the programme during 1989-91. Three scientists had undergone training in Germany on various aspects of data acquisition, data processing and interpretation.

In July 1992, CSIR observed that at least 50 *percent* sharing of funding was necessary to pursue the programme. A meeting

was held with the representatives of Central Water Commission in November 1992 to explore the possibilities of getting external funding for implementation of the project which concluded without any fruitful results.

In December 1992, RC recommended that further project work including funding be deferred until a firm commitment for external funding of 50 *percent* of the project cost was assured, any further expenditure out of Rs 1.04 crores paid to the firm be frozen and suitable scientific personnel be inducted only after the project was fully funded.

Thus, the project had not progressed even after investing Rs 1.44 crores as it was undertaken without proper planning and without taking into account all relevant factors.

(ii) NGRI undertook a research project: 'Studies on wave equation in seismic data interpretation' in September 1985. The duration of the project was three years.

While reviewing the progress report in June 1988, RC remarked that the principal investigator could not get any numerical results since no effort was made to compute the migrated field and suggested close monitoring by a senior scientist. In its meetings held in October 1989 and April 1990, RC recommended termination of the project and preparation of the terminal report. The terminal report on the project was submitted in April 1991. The report was yet to be evaluated.

Objectives of the project on which expenditure of Rs 9.50 lakhs was incurred were not achieved.

(iii) A project: 'Modelling of electrical structure beneath the Saurashtra (Kathiawar) peninsula and its adjoining regions' was started in December 1988.

The project which was to be completed during 1991-92 was short closed in 1989-90 on the advice of RC due to its poor progress. An expenditure of Rs 2.65 lakhs incurred on the project remained unproductive.

(iv) The project: 'Design and development of an efficient electrical technique for groundwater prospecting' was started in June 1988 and was to be completed by March 1991. In March 1989, a detailed theoretical analysis was

undertaken to specify the parameters of the proposed field instruments. A computer programme was written to compute the transient E-field components of HED sources for step function excitation. RC in its meeting held in November 1990 noticed that there was no progress on the project since April 1990. In March 1991, the review of the project showed that the principal investigator (PI) could not procure all the components required for building the equipment and was unable to handle the work of hardware design cast and RC directed that PI should not pursue the hardware design work any further and should instead concentrate on theoretical studies and come up with a new proposal. PI was also instructed to submit the terminal report on the work done. The terminal report was submitted in December 1991. The total expenditure incurred till March 1991 was Rs 13.15 lakhs.

Thus, the project started in June 1988 was short closed after spending Rs 13.15 lakhs without achieving the desired results.

12.2.5 Technology Mission on drinking water in villages

During the international water supply and sanitation decade, Government of India launched a National Technology Mission on drinking water in villages and related water management so as to provide adequate supply of 40 litres per capita per day of good quality drinking water in rural areas through effective application of science and technology.

As per the memorandum of understanding entered into between CSIR and the Department of Rural Development (May 1987) the following programmes were entrusted to NGRI:

- Hydrological survey for location of suitable well sites,

- Assessment and optimal management of water resources, and

- Geophysical survey for selection of suitable sites for check dam, percolation tanks and rain water harvesting structures to augment and conserve water resources.

NGRI received Rs 133.10 lakhs from the Department of Rural Development and had spent Rs 87.64 lakhs upto December 1992.

Source findings

NGRI carried out investigations on source findings for drinking water in difficult hydro-geological regions spread over 15 districts. As per the status report (as on December 1992) NGRI surveyed 1235 villages in 15 different districts and 1389 sites in 945 villages.

Out of 590 wells for which information was collected, yield particulars for 474 wells only were available. In respect of 46 wells the yield was poor or very insignificant and these were treated as failure.

In the absence of yield particulars in respect of 915 sites i.e. whether any drilling was done and whether adequate yield was obtained, the water problem of the villages remained unidentified.

NGRI stated (July 1993) that solving of the problem of drinking water in villages was the responsibility of the National Technology Mission on drinking water and concerned State Government and NGRI task was to provide science and technology inputs only and that too on a demonstration basis for source finding in some selected areas.

NGRI had spent Rs 46.86 lakhs on source finding. Due to lack of proper coordination between State Government agencies and NGRI, adequate information could not be gathered.

Non-achievement of objectives

The science and technology steering committee of CSIR approved the research project: 'Development and application of hydraulic fracturing stimulation technology to increase yields of water wells in hard rock terrains' with the duration of three years, from 1988-89 to 1990-91, and an amount of Rs 15 lakhs was provided by CSIR.

The progress of the project was considered insignificant in April 1991. The main reason for lack of progress was non-procurement of various equipment/items required for the project. In November 1991, the Director, NGRI suggested closure of the project in view of tardy progress. RC, in its meeting held in April 1992, suggested that the task of design and prototyping of a hydraulic fracturing unit be

referred to Central Mechanical Engineering Research Institute (CMERI), Durgapur for comments, and to identify an agency which would undertake the manufacture of such units for commercialisation in due course.

A revised and updated hydro-fracturing stimulation equipment was sent to CMERI in April 1993 for assessment and comments. CMERI's comments were awaited. The total expenditure incurred under the project upto December 1992 was Rs 2.44 lakhs.

Thus, the programme identified under the Technology Mission made very tardy progress and could not achieve the desired objectives.

12.2.6 Sponsored projects

Undercharging sponsored projects

NGRI undertook a sponsored project on behalf of the erstwhile Oil and Natural Gas Commission (ONGC) for deep seismic sounding studies in profile in Cambay Basin in November 1986.

As per CSIR's instructions, 200 *percent* mandays costs were to be charged but the cost of the project was worked out as Rs 90 lakhs with an incorrect rate of the overhead charges (40 *percent* of mandays). Consequently there was undercharging of Rs 41.73 lakhs.

Outstanding dues

An amount of Rs 30.71 lakhs was lying outstanding from the sponsors.

In the case of projects sponsored by Oil India Development Board, NGRI had spent Rs 6.98 lakhs over and above the funds received from sponsors. While accepting the facts, NGRI stated in June 1993 that the excess was due to escalation in foreign exchange rates.

Non-accounting of assets acquired out of funds of sponsored projects

Expenditure incurred out of funds received for sponsored projects resulted in creation of capital assets. Such

equipments/assets remained the property of the sponsoring agencies unless they were gifted to NGRI. In a number of cases though the projects were completed/terminated long back no action was taken by NGRI for getting the equipments gifted inspite of the instructions issued by CSIR in October 1988. This had resulted in non-reflection of such assets in the final accounts.

12.2.7 Project monitoring and evaluation

Each laboratory of CSIR is required to set up a project monitoring and evaluation (PME) cell as a focal point for implementation of the projects, budgeting and cost accounting and to maintain project folders for each of the projects containing essential information like initial proposal, project authorisation and its code number, records relating to recommendations of internal committee, Research Council's and Management Council's periodical reports - both physical and financial and completion reports on the projects. Reports were required to be periodically submitted to the internal committee and to the project leader for taking remedial measures, if necessary. Though NGRI had set up a PME cell for project monitoring and evaluation, the periodical progress reports and completion reports in respect of in-house projects were not available with PME cell. The monitoring of in-house projects was not done with the result that the final report in respect of completed projects could not be prepared and submitted. Expenditure continued to be booked under the projects already completed/terminated which was not a correct practice.

12.2.8 Scientific publications

During 1988-92 the scientists of NGRI published 236 research papers in national (114) and international (122) journals.

The average output of scientific publications as compared to the number of scientific staff was less than one per scientist per year.

12.2.9 Royalty and premia

NGRI undertook the work of design, development and fabrication of geophysical instruments with indigenous know-how and components and the know-how thus developed was transferred to entrepreneurs for commercial exploitation on

royalty/premia basis. The amount of premium received during the period 1988-93 was Rs 0.14 lakh which was less than one *percent* of the total revenue of NGRI.

12.2.10 Purchases

Outflow of foreign exchange

According to the General Financial Rules all contracts for purchases involving import of materials from abroad should as a rule provide for purchases on FOB basis so as to avoid payment of insurance/freight charges in foreign currency.

During 1988-93, NGRI had made purchases on CIF basis instead of FOB basis. Non-observance of GFR provisions in 93 cases resulted in avoidable outflow of foreign exchange to the extent of Rs 10.05 lakhs during this period.

Undue benefit given to a firm

In January 1991, NGRI entered into an agreement with a firm for procurement, supply, installation and upkeep of a CDC 180/850 computer system. According to the terms and conditions of agreement, the firm was to procure, install and conduct acceptance test of the equipment and to provide one time satisfactory functional demonstration of the integration of the equipment and comprehensive trouble free maintenance for a period of one year from the date of acceptance of the equipment.

The first part of the system was accepted in November 1989 and the second part in March 1990 and annual maintenance contract for the two parts was entered into with the firm in March 1991 after the expiry of the warranty period.

Since the computer system as a whole as defined in the agreement was accepted in March 1990, the warranty period of the equipment was to be considered from March 1990 for one year for both the parts. Instead, the period of one year warranty was made effective from November 1989 for the first part. This resulted in avoidable payment of annual maintenance charges of Rs 8.91 lakhs to the firm.

NGRI stated in June 1993 that the receipt of the two part systems on two different dates was discussed by the expert committee in March 1990 and the two parts were accepted as

they were functionally independent units and hence maintenance contract entered into with the firm on different dates. The reply is not tenable since as per the agreement the firm was responsible to provide one time satisfactory functional demonstration of the integration of the equipment and only from that date the warranty period should have been applicable.

Delay in installation of equipment

In a number of cases there was delay in installation of equipment ranging from ten months to 35 months. A few illustrative cases are given below:

Sl No	Equipment	Cost	Month of receipt	Month of installation	Delay
		(Rs in lakhs)			
1.	NELCO System 55 KVA Accu Power UPS	10.17	April 1990	October 1991	18 months
2.	Cyber computer mainframe Model 850-A based system	323.92	April 1989	March 1990	11 months
3.	Portable digitals seismic field system, DFSV 60 seis channels	59.54	April 1988	March 1989	11 months
4.	Update of 602D mass spectrometer to a 903 system	5.89	February 1991	December 1992	22 months
5.	Cat No. 4008 source control unit	2.45	November 1991	December 1992	13 months
6.	Digital memory scope DMS-6440 ZVS/word writing speed 12 bit X 4096 word	1.23	December 1986	November 1989	35 months
7.	Model 2025 UV argon ion laser with liner etc.	6.56	November 1989	October 1990	11 months
8.	RS-510-8 Research series table top with XL-48-28 support system ACMP-02 compressor assembly	3.09	December 1989	October 1990	10 months
9.	SOPRA SONA high resolution laser Raman spectrometer	36.93	July 1990	October 1991	15 months

10.	Laser head, argon with power supply 220 V LIG	1.61	June 1990	June 1992	24 months
11.	Optical simultaneous multichannel analyser	9.16	July 1990	August 1991	13 months
12.	Wild M8 stereo zoom microscope	3.19	September 1991	October 1992	13 months
13.	DGR 33 Graphic/recorder data acquisition system	4.44	September 1988	February 1990	17 months
14.	T-106 Highly portable winching system, T-201 portable analogue recording system, T-156 Rate meter module system	6.09	August 1989	February 1991	18 months
15.	Micro drilling machine model H-	1.42	March 1990	March 1991	12 months
16.	Multigrade Water Filter	1.20	April 1988	August 1989	16 months

12.2.11 Other interesting points

(i) Recurring loss on electricity

Bulk supply of electricity was made by the Andhra Pradesh State Electricity Board **(APSEB)** to NGRI at prevailing industrial rate varying from Rs 1.51 to Rs 2.28 per unit. A part of it is supplied to residential quarters for which recoveries are effected @ 60 paise per unit for the first 100 units and @ 70 paise per unit in excess of 100 units. The incorrect fixation of rate per unit resulted in undercharging the employees to the extent of Rs 11.58 lakhs during the period 1988-93.

(ii) Publication of bulletin

RC recommended (June 1988) discontinuing publication of 'Geophysical Research Bulletin', a priced publication published by NGRI. But this was not done and copies of journals worth Rs 3.31 lakhs were lying unused. The value was written off in April 1990.

NGRI stated in June 1993 that the research papers already under process were accepted for publication after careful consideration and with the permission of the Director.

12.2.12 Accounts

(i) Outstanding advances

NGRI had been making advance payments to officials, private parties, Government organisations etc. on account of travelling allowance, leave travel concession, supply of materials, equipment etc. As on March 1993, Rs 230.96 lakhs were awaiting adjustment. Of these Rs 20.05 lakhs were with the officials (from 1988-89), Rs 158.42 lakhs with private parties, Rs 6.00 lakhs with Government organisations (from 1984-85).

(ii) Bank reconciliation

Bank reconciliation statement was prepared upto March 1993. However, adjustment/settlement of discrepancies were yet to be done since 1986-87 as shown below:

Year	Debit raised by bankers not taken in cash book	Credits afforded by Bankbut not taken in cash	Valuables deposited credits not afforded by bankers	Cheques issued but not debited by bank book
				(Rs in lakhs)
1986-87	0.25	-	0.06	-
1987-88	0.20	-	0.02	-
1988-89	0.07	0.36	0.20	-
1989-90	0.41	0.47	-	-
1990-91	0.52	0.03	-	-
1991-92	0.01	0.05	0.06	-
1992-93	0.99	2.79	5.20	73.52
Total	2.45	3.70	5.54	73.52

NGRI stated in June 1993 that action was being initiated to settle these long pending items.

12.2.13 In sum,

- NGRI is mainly financed out of grants received by the Council of Scientific and Industrial Research (CSIR) from the Department of Scientific and Industrial Research. NGRI was to generate funds from outside agencies to the extent of 33.3 *percent* of the revenue expenditure, but the funds generated during 1988-93 fell far short of the percentage fixed (not more than 14 *percent* in any year).

- Out of the thirty projects completed during 1988-93, there was delay upto three years in submission of final reports on twenty projects.

  After spending Rs 1.44 crores, further work on a tectonic project was deferred for want of 50 *percent* funding from external sources, which was not foreseen at the initial stage.

  Three projects were foreclosed after spending Rs 25.30 lakhs for various reasons, rendering the entire expenditure unproductive.

- Technology mission project on drinking water could not progress even after an expenditure of Rs 87.64 lakhs.

- Adoption of incorrect rates of the overhead charges from ONGC resulted in loss of Rs 41.73 lakhs to NGRI.

- There was inadequate monitoring of projects notwithstanding setting up of a cell for project monitoring.

- The amount received by NGRI towards royalty/premia and consultancy charges during 1988-93 was a negligible component (less than one *percent*) of the total receipts of NGRI.

- Incorrect fixation of rate for electricity charges for residential quarters resulted in loss of Rs 11.58 lakhs during 1988-93.

12.3 Equipments lying idle

In course of test-check of records of laboratories/ institutes of the Council of Scientific and Industrial Research (CSIR), it was seen that equipments worth Rs 29.67 lakhs were either not installed or not used for periods ranging from nine months to over six years as detailed below:

(i) Regional Research Laboratory, Bhubaneswar procured a submerged arc smelting furnace in February 1991 at a cost of Rs 14.28 lakhs for the Indo-German project: 'Agglomeration of Orefines'.

The furnace was installed in October 1991. But, it could not be commissioned as the Laboratory had failed to stipulate the parameters of the transformer attached to the furnace in the purchase order and, therefore, transformer with incorrect specification was supplied. The purchase order did not provide for pre-despatch inspection and the deficiency was noticed only at the time of commissioning.

The transformer and regulator already supplied were replaced by the supplier in July 1992. Finally, the furnace was commissioned in May 1993 and could not be utilised for the project which had been completed earlier.

Thus, the expenditure of Rs 14.28 lakhs proved infructuous as a result of incomplete and defective order. CSIR stated in November 1993 that the equipment would be used in other projects likely to be taken up by the Laboratory.

(ii) Regional Research Laboratory, Bhubaneswar imported one high compression roller mill from a foreign firm at a cost of Rs 3.84 lakhs. The consignment was received in the Laboratory in December 1989. The action for procurement of accessories and providing infrastructure necessary for installation of the equipment was initiated in April 1990 and an expenditure of Rs 3.02 lakhs was incurred thereon during 1990-91. Even after more than three years, the equipment could not be installed due to non-availability of necessary infrastructure. Thus, an amount of Rs 6.86 lakhs, including foreign exchange, remained blocked for over two and half years besides not meeting the requirements for which it was procured.

CSIR stated in February 1994 that such delay was due to non-availability of the complete unit with the principal supplier and procurement of spares and accessories in phased manner. It was also stated that installation has now been completed and the equipment was ready for use.

(iii) Based on an indent (August 1979) for purchase of a surface roughness tester for measurement of surface roughness of newly developed materials, Regional Research Laboratory, Trivandrum placed an order on a foreign firm in December 1980 for supply of the instrument at a cost of Rs 5.35 lakhs. The instrument was received in July 1981 in damaged condition. Due to delay in settling the claim with Insurance, replacement of certain damaged parts from the firm was delayed and the equipment could be installed only in March 1986. It was seen that the instrument worked for 3 days only in June 1986 and thereafter it failed due to some problem in the microprocessing unit and remained idle ever since. The instrument went completely out of order in 1987 and could not be reconditioned.

The Laboratory stated in July 1993 that no R&D project in this particular area was taken up as planned earlier since concerned specialist scientist had left the laboratory. Hence, the instrument was used for routine surface measuring of materials received from outside agencies. It was also stated that action to raise necessary funds to recondition the instrument through sponsored project was being attempted for utilising the instrument in other areas and the possibility of transferring it to other sister units was also being explored.

Accepting the facts, CSIR stated in December 1993 that in the absence of sufficient R&D work for its use, the Laboratory was contemplating transfer of the instrument to a sister laboratory (yet to be identified).

Thus, the requirement of the instrument was not clear and even now the area in which the instrument could be used had not been identified. The expenditure of Rs 5.35 lakhs incurred on procurement of the instrument was unnecessary and remained unfruitful.

(iv) Regional Research Laboratory, Jorhat imported in March 1987 one Conviron plant growth chamber model EF-7 at a cost of Rs 1.95 lakhs for tissue culture studies. As the precise

mode of installation of the equipment had not been decided at the time of purchase, the Indian agent was paid Rs 0.06 lakh for installation. The chamber, however, could not be operated for want of a water demineralization unit and associated pump. The foreign supplier stated (May 1988) that no pressure pump was required as the demineralized water supply (2 litres per hour) was to be gravity fed. The Laboratory paid Rs 0.06 lakh to another Indian firm for looking into the non-functioning of the equipment. The reasons for non-functioning had still not been identified. With the result the research work on tissue culture was hampered in addition to unfruitful expenditure of Rs 2.07 lakhs.

CSIR stated in January 1994 that the equipment went out of order in April 1991 after working for about four years and the Laboratory is making efforts to get it repaired. However, CSIR's statement was at variance with facts in as much as the concerned scientist had complained in January 1993 about research work being hampered greatly for 5½ years in the absence of proper functioning of the equipment.

(v) In November 1983, Central Road Research Institute invited quotation from a foreign firm for supply of Flexure Apparatus with spare parts. As per the firm's invoice (December 1983) cost of equipment was US $ 9003.12 (Rs 1.11 lakhs) excluding agency commission. The equipment and spare parts were received in August 1985. The equipment could not be installed satisfactorily since its receipt. The defects could not be rectified by the Indian agent of the foreign firm and the foreign firm did not respond.

While accepting the facts, the Institute stated in February 1993 that other sister institutes of CSIR were trying their best to rectify the equipment and install it.

The equipment has been lying idle for over five years besides the object for which the equipment was procured could not be served.

CSIR stated in December 1993 that the equipment was set right by one of the sister laboratories and was on trial run since September 1993.

12.4 Excess expenditure for unconsumed power

National Metallurgical Laboratory (**NML**), Jamshedpur entered into an agreement with Tata Iron and Steel Company Limited in 1956 for supply of a maximum demand of 480 Kilo Volt Amperes (**KVA**) high tension electricity.

In March 1979, power requirement was revised to 1980 KVA and one clause to this effect was inserted in the agreement. With this change, Annual Guaranteed Minimum charges were to be paid at 75 *percent* of contractual demand, if actual consumption was less. Based on requirement, NML reduced the maximum demand to 1250 KVA in April 1988 and further reduced to 1005 KVA in July 1992. A review of power consumption during April 1979 to November 1993, however, revealed that NML had consumed much less power than the contracted demand and as a result, an avoidable extra payment of Rs 56.16 lakhs for unconsumed power for the period 1984-90 had to be made.

While accepting the facts, the Council of Scientific and Industrial Research assured in October 1993 that the contractual demand of electricity consumption would be reviewed from time to time in future to avoid extra payments.

12.5 Short recovery from private parties

Industrial Toxicology Research Centre (**ITRC**), Lucknow had developed in December 1989 a technology of mobile testing water laboratory for carrying out spot analysis of drinking water and granted licence in August 1990 and March 1991 to firms 'W' and 'X' respectively for productionisation of the know-how. The licence fee payable by the firms was:

(i) Rs 1 lakh on signing the agreement;

(ii) Rs 0.50 lakh per year for a period of seven years as deferred payment of lumpsum, irrespective of production or sale, backed by suitable bank guarantee; and

(iii) consultancy fee of Rs 0.25 lakh per year for seven years.

The concerned firms had paid the initial Rs 1 lakh each only and none of the deferred payments have been received from

them so far (November 1993). Accordingly, an amount of Rs 2.60 lakhs has become due from them till June 1993.

Because of failure to obtain the bank guarantee before transfer of technology, ITRC has been unable to enforce recovery of the deferred payments (January 1993). ITRC had, however, neither issued legal notices to the firms nor obtained legal advice on feasibility of filing suits against them.

While accepting the facts Council of Scientific and Industrial Research stated in November 1993 that ITRC has been pursuing the matter with both the firms for recovery of deferred payment and a proposal submitted by the firms in this regard was under examination.

CHAPTER XIII

Utilisation of Foreign Aid

13.1 Audit review of projects in the Ministry of Environment and Forests and the Ministry of Non-Conventional Energy Sources

13.1.1 Introduction and scope of audit

There are two kinds of drawals against foreign loans and grants viz. through (a) reimbursement and (b) direct payment or commitment procedure. Under the reimbursement procedure, eligible expenditure incurred on the project by the project authorities is got reimbursed from the donor, by crediting to Central Government accounts through Reserve Bank of India (RBI). Under the direct payment method the donor releases authorised payments towards cost of supplies and services pertaining to the project directly to the supplier/ consultants etc. by debiting the related loan/grant account. In both cases, budgetary provision is made by the project authorities. The Controller of Aid Accounts and Audit (CAA&A), Ministry of Finance keeps detailed accounts of all foreign loans/grants which enter Central Government accounts.

Utilisation of external assistance (loans and grants) received for projects under the Ministry of Environment and Forests (MEF) and the Ministry of Non-Conventional Energy Sources (MNES) was reviewed in audit for the period 1984-93. A total of 10 projects/sub-projects were selected for review, five belonging to MEF and five under MNES. Total outlay on these selected projects was Rs 824.04 crores.

13.1.2 Highlights

- Total outlay of the 10 projects (five in MEF and five in MNES) test-checked in audit was Rs 824.04 crores. Extent of aid funds utilisation ranged from 0.81 *percent* to 100 *percent*. In two projects, utilisation was less than 50 *percent* and in another two projects figures of utilisation were not available. Total revision of time span with reference to the original target varied from five to sixty months in the ten projects. In four cases the objectives had not yet been

achieved, in one case they had not been fully achieved, in two cases they had not been achieved at all and in three cases information was not available in the Ministries.

(Para 13.1.3)

Under 'National social forestry project', aided by World Bank and the United States Agency for International Development (USAID), cases of wrong classification resulting in non-reimbursement (Himachal Pradesh), excess purchase of polythene granules, non-transfer of plantation areas to gram panchayats (Rajasthan), non-compliance with orders resulting in loss of revenue, non-conformity to norms of World Bank resulting in non-reimbursement and excess procurement of vehicles (Uttar Pradesh) were noticed in audit. World Bank's assessment of project weaknesses in Uttar Pradesh indicated lack of marketing information system, problems in supply of seedlings, ineffective monitoring and analysis of project research and its use in project management decisions.

There were delays in completion of Ganga Action Plan (GAP) programme in the 'Integrated sanitation works in Kanpur and Mirzapur'. Effective performance of the upflow anaerobic sludge blanket system is dependent upon the adoption of technology for chromium recovery from tanneries' discharges. A mid-term evaluation report (February 1992) revealed that only 26 out of 151 tanneries were likely to adopt chromium recovery thereby affecting the performance of upflow anaerobic sludge blanket system. The technology for post-treatment of effluents from upflow anaerobic sludge blanket system was still in an experimental stage in Netherlands and therefore could not be adopted in India.

Non-installation of equipments, training details not being available, delays in planning, detailed review not having been conducted were some of the problems that afflicted the project: 'Technical assistance and equipments' aided by United Kingdom. Also, no details of the aid received were available.

Aid provided by Government of Sweden for 'Strengthening of Indian Institute of Forest Management' could not be

utilised substantively because of management problems, infighting in the faculty, problems in design of management development programmes etc.

In the project: 'Strengthening of Central and State Pollution Control Boards laboratories', equipment had not been utilised, training contracts had not been met, consultancy provision had not been fully utilised and there had been endemic delays.

The project progress review report in its analysis also indicated lack of clarity in planning, problems in management and coordination by Central Pollution Control Board (CPCB) and problems in coordination between Indian authorities and German Technical Cooperation Agency (GTZ) head office. No details of the aid received were available.

In the project: 'Development of amorphous silicon solar cells', there were problems in commissioning of equipments, non-transfer of technology to pilot plant, inadequate production of solar cells and in the project: 'R&D studies on woody bio-mass species for arid marginal lands' funded by USAID, there was no information on project completion and achievement of objectives.

In the project: 'Production of woody bio-mass under sub-standard soils' aided by USAID, there were delays in supply of equipments and inadequate gestation period for research results; the project had to be extended a number of times and completion report had also not been received.

In the project: 'Windmill farms' aided by Danish International Development Agency (DANIDA), there were defects in the operation of the equipments resulting in lower achievement. The project had not been approved by the Planning Commission and agreements had been signed directly between DANIDA and the Department of Economic Affairs (DEA). As a result, the suspense account could not be cleared in the absence of budgetary provision.

In the project: 'Solar thermal ice pack freezers and milk chilling plants', equipments installed remained idle due to technical faults. The project was closed in

November 1992 because the technology did not prove viable in Indian conditions; closure of the supplier company in Denmark resulted in problems in maintenance of the equipments. Indian investment in the form of customs duty had also become infructuous. No details of the aid received were available.

(Para 13.1.4)

13.1.3 Allocation, extent of utilisation, revision of time span and status of achievement of objectives

The table below indicates the allocation both in foreign currency and in rupee equivalent, percentage utilisation, revision of time span with reference to original targets in number of months and status of achievement of objectives as on 30 June 1993 in respect of all the projects test-checked in audit:

Sl No.	Name of the project	Allocation/ Outlay		Percen-tage utilisa-tion	Time overrun	Status as on 30 June 1993
		Foreign currency in million	Rupee equivalent in lakhs		In months	
I.	Social Forestry					
	National social forestry project (Gujarat, HP,UP and Rajasthan)	SDR 155.4 US $ 65.6	39703.00 20072.11	100 81.33	36	Not available
II.	Ganga Action Plan					
i)	Integrated sanitation works in Kanpur and Mirzapur	Dfl 50.0	8683.10	35.66	33	Not yet achieved
ii)	Technical assistance and equipments	Not avail-able	400.00	Not avail-able	46	Not yet achieved

III. Strengthening of Institutes/Laboratories							
i)	Strengthening of Indian Institute of Forest Management, Bhopal	SEK	31.5	674.00	0.81	NIL	Not achieved (Project closed)
ii)	Strengthening of Central and State Pollution Control Boards laboratories	DM	11.35	2218.56	Not available	16	Not yet achieved
IV.	R&D in Non-Conventional Energy						
i)	Development of amorphous silicon solar cells	US $	2.94	899.53	94.22	17	Not yet achieved
ii)	R&D studies on woody bio-mass species for arid marginal lands (Madurai Kamaraj University/ Bharathidhasan University, Trichy)	US $	0.54	165.22	100	55	Not available
iii)	Production of woody bio-mass under sub-standard soils (National Botanical Research Institute, Lucknow)	US $	0.46	140.74	100	60	Not available
V.	Projects relating to utilisation of imported equipments						
i)	Windmill farms Project (20 MW)	DKR	180.00	9133.56	99	5	Not fully achieved

ii) Non-Conventional Energy Pilot Poject - 10 Solar thermal ice pack freezers and 3 Solar thermal milk chilling plants	DKR	6.203	314.75	100	23	Not achieved (Project closed)
Total			82404.57			

Notes:

(i) Outlay has been converted to Indian rupee based on average exchange rates for the year 1992-93 adopted by the Ministry of Finance, CAA&A, New Delhi except for the projects at S.No. II(ii) and III(i) for which the rupee value was obtained from MEF's records and at S.No.I(i) for which the rupee value was available in the records of CAA&A.

(ii) Percentage of extent of utilisation has been worked out with respect to foreign currency outlay and utilisation in foreign currency.

The aid funds utilisation ranged from 0.81 *percent* to 100 *percent*. In two projects utilisation was less than 50 *percent* and in another two projects figures were not made available either by MEF or by CAA&A.

Total revision of time span with reference to original target varied from five to sixty months in the ten projects.

In four cases, objectives had not yet been achieved, in one case they had not been fully achieved, in two cases they had not been achieved at all and in three cases the information was not available in the implementing Ministries.

13.1.4 Project analysis

Out of the 10 projects, external assistance was received in the form of reimbursement in three, in the form of direct payment in another three and information regarding the payment procedure was not available in case of the remaining four.

Effectiveness of the projects has been discussed in the succeeding paragraphs.

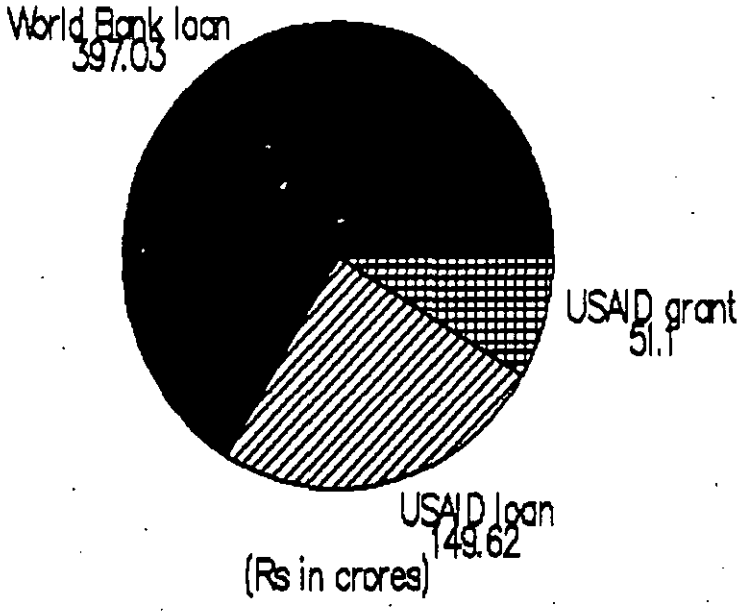
A) National social forestry project

National social forestry project **(NSFP)** was under implementation in four states viz. Himachal Pradesh, Rajasthan, Uttar Pradesh and Gujarat for a period of five years from 1985-86 to 1989-90 with a total outlay of Rs 597.75 crores. The scheme envisaged development and afforestation of about 709000 hectares of wastelands through people's participation. The project was extended upto March 1993 to utilise the aid fully.

External aid in the form of grant and loan equivalent to Rs 477.56 crores was received through reimbursement from World Bank and USAID during the period 1985-93. Objectives of social forestry in general are to raise income and employment among the rural poor by increasing production of small timber, fuel wood, fodder and other forest products. An important collateral goal served by achievement of the main goal is to arrest erosion of the national environment caused by deforestation. Social forestry programmes implementation implies full involvement of the people as individuals and as members of the local communities.

Given below is the break up of aid received from different international institutions.

Foreign Aid For National Social Forestry Project



In test-check in different states, the following points were noticed.

(i) Himachal Pradesh

Wrong classification resulting in non-reimbursement

A sum of Rs 21.69 lakhs incurred towards incremental salary, travelling and medical expenses in respect of staff neither sanctioned nor exclusively deployed for the project was booked by Government of Himachal Pradesh under non-Plan expenditure during 1991-92. Since non-Plan expenditure did not qualify for reimbursement by donor agency, the amount could not be reimbursed.

(ii) Rajasthan

Unutilised seedlings

Despite the fact that the project was to be closed in March 1993, two crore seedlings were raised in the last quarter of 1992-93 for distribution to the public and other agencies during 1993-94, out of which no seedlings were distributed as of October 1993, resulting in unfruitful expenditure of Rs 165 lakhs. In addition to the two crore seedlings raised, the State Government had in stock, as of March 1993, unutilised balance of 59.06 lakh seedlings.

Excess purchase of polythene granules

The Deputy Conservator of Forests, Social Forestry, Sawai Madhopur used 35770 kg granules for making polythene bags for raising plants during the period 1985-93. But, it was seen that 57170 kg granules were purchased and as such 21400 kg granules were purchased in excess of requirement. Government of Rajasthan while accepting the facts (November 1993) intimated that the excess polythene granules were purchased in the hope that the project would be extended beyond March 1993. The balance 21400 kg granules were lying in the stores (November 1993).

In another case, the Deputy Conservator of Forests (North), Udaipur purchased 1000 kg polythene granules without requirement and the stocks were issued (May 1991) to the Conservator of Forests, Indira Gandhi Nahar Pariyojana, Bikaner for utilisation on schemes/projects other than NSFP. Neither were the granules returned nor was credit passed on to NSFP (March 1993).

In East Division, Jaipur granules worth Rs 28.60 lakhs were purchased on 29 March 1993. Payment was released on 30 March 1993 and the granules received on 31 March 1993, the closing date of the project. The entire quantity was lying unconsumed (October 1993).

Household farm forestry

Household farm forestry is an individual beneficiary scheme aimed at subsidising afforestation of wastelands. It was noticed that the targets for household farm forestry were

fixed and revised several times. According to the information furnished by the State Government, targets under this scheme were finally reduced to 870 hectares due to not making available the required land to the landless people by the Government.

Year-wise and division-wise statement of achievement furnished by the Chief Conservator of Forests and Director of Social Forestry in October 1993 revealed scheme achievement of 782.62 hectares as against the target of 846 hectares.

Due to lack of proper attention by the Forest Department towards this scheme the object of involving the landless people in the project was defeated.

Non-transfer of plantation areas to gram panchayats

A test-check of the records of seven divisions revealed that the divisions had covered 623 hectares plantation areas, out of which only 25 hectares plantation areas had so far been transferred to the panchayats. The concerned District Forest Officers stated that the respective gram panchayats were not ready to take over the plantations raised on the panchayat lands.

The State Government while accepting the facts intimated in November 1993 that 240 hectares of plantation area in Dausa and Bhilwara divisions had been handed over to panchayats and efforts are being made in other cases also to get the plantation areas transferred to panchayats.

(iii) Uttar Pradesh

Free distribution of seedlings resulting in loss of revenue

In Uttar Pradesh, the mid-term review conducted by World Bank recommended that distribution of free seedlings should be abolished. The State Government decided to discontinue free distribution from March 1989, but the State Forest Department issued orders to all Social Forestry Divisions only in June 1991.

Test-check (March 1992) of records of the Conservator of Forests (Monitoring and Evaluation) Social Forestry, Uttar Pradesh revealed that Forest Divisions distributed 35.19

lakh seedlings valuing Rs 14.08 lakhs free of cost in 40 districts during the period from July 1991 to February 1992, resulting in a loss of revenue of Rs 14.08 lakhs.

Non-reimbursement due to not following World Bank norms

Test-check of records of Avadh Forest Division, Lucknow (September 1993) revealed that a sum of Rs 1.65 crores was initially sanctioned for construction of 426 residential quarters in 1986-87. The Division made advance payments of Rs 5.21 crores (Rs 2.72 crores in 1987-88, Rs 2.40 crores in 1988-89 and Rs 0.09 crore in 1991-92) to the Uttar Pradesh Rajkiya Nirman Nigam for this construction under the World Bank aided Social Forestry Project, without inviting tenders and formulation of agreements as per requirements of norms prescribed by the World Bank. The legal formalities of land transfer was also not completed. This resulted in litigation and stoppage of work from time to time.

Meanwhile the number of quarters was also reduced from 426 to 118 without the approval of Government. The Nigam spent Rs 1.84 crores upto June 1993 but building work was still incomplete (September 1993).

The entire amount of Rs 5.21 crores advanced to the Nigam was not reimbursed by the World Bank.

Excess procurement of vehicles

The World Bank in its report of January 1993 remarked that the Government of Uttar Pradesh procured vehicles in excess as shown below:

Category	Targets in numbers	Actuals in numbers	Actuals as percentage of targets
Car	6	13	216
Jeep	51	85	166
Van	6	21	350
Motorcycle	260	-	0
Tractor	13	157	139

Factors affecting sustainability of the project

The World Bank in its report of January 1993 indicated that the following weaknesses had affected sustainability of the project in Uttar Pradesh:

- lack of marketing information system,

- inadequate and unsustainable role of private nurseries in supply of seedlings, and

- ineffective monitoring and analysis of project research and its use in project management decisions.

MEF stated in December 1993 that for utilisation of external aid, project implementing States and DEA were responsible and the role of MEF was to provide coordination and facilitation and further that the physical and financial targets were achieved. Audit is, however, of the opinion that being the nodal authority for monitoring and offering technical support, MEF should accept the responsibility for effective utilisation of foreign aid.

B) Ganga Action Plan

A grant valuing Rs 22.48 crores was received from Netherlands. Details of funds received from UK were not available. Funds were given to two separate projects viz.

- Integrated sanitation works in Kanpur and Mirzapur (Rs 86.83 crores) and

- Technical assistance and equipments (Rs 4 crores).

(i) Integrated sanitation works in Kanpur and Mirzapur

The project funded by Netherlands was to develop an integrated approach to sewerage, drainage, sanitation, domestic and industrial waste water, to control pollution on the river Ganga and improve living conditions.

The project comprised 20 schemes which started in April 1987: phase I engineering design for one and a half years and phase II for two and a half years. In the work plan for January 1990 onwards the targeted completion date for all schemes was stipulated as March 1992 as per suggestion of

the Ganga Project Directorate (GPD) on the advice of the implementing agencies during the 6th project review panel meeting in October 1989. In 1990 itself there was revision of schedules which extended the target to June 1992. Further, the 2nd joint mid-term evaluation mission (November/December 1991) recommended extension of the project till December 1993. Out of 20 schemes, 15 are still incomplete as detailed below:

Status of incomplete works

Sl No	Name of Scheme	Sanctioned cost	Expenditure upto 31 March 1993	Stipulated date of completion	Comments offered in 24th Steering Committee Report on15 June 1993
		(Rs in lakhs)			
Kanpur					
1.	Expansion of sewerage system	271.19	248.68	June 1993	Road restoration work pending
2.	Storm water drainage improvement system	215.48	210.48	December 1993	Additional works to be taken up for utilisation of surplus funds.
3.	UASB plant at Jajmau	942.81	378.83	December 1993	Slow progress of work.
4.	Low cost sanitation	161.37	143.45	June 1993	Slow progress by Kanpur Nagar Mahapalika.

5.	Water supply programme for Jajmau area	234.13	200.96	December 1993	Slow progress of work, additional tubewells to be undertaken under surplus funds
6.	Solid waste management	54.37	33.29	June 1993	Slow progress of work.
7.	Common conveyance system for tannery waste water	228.77	256.58	December 1993	Additional tanneries to be connected from surplus funds.
	Sub-total	2108.12	1472.27		
Mirzapur					
1.	Water supply programme (crash and main) Integral sanitation programme (financed by Govt. of UP)	---	---	September/ December 1993	A sum of Rs 185.92 lakhs sanctioned from GPD.
2.	Low cost sanitation	249.23	176.55	June 1993	Delayed due to non-completion of sewerage schemes.
3.	UASB waste water treatment	262.04	250.93	December 1993	Slow progress of work.
4.	Solid waste management	44.00	25.00	September 1993	Detailed Project Report yet to be received. Recommended for closure as it is.

5.	Public Health Education and Community Development	39.12	29.42	December 1993	Extended for utilisation of the surplus funds.
6.	Wide mesh sewerage system (core-area)	253.65	191.41	June 1993	Slow progress of work.
7.	Expansion of sewerage system in non-core areas	254.72	121.47	September 1993	Delay due to land acquisition problem.
8.	Interceptor sewer and pumping stations	256.00	270.47	June 1993	Slow progress of work.
	Sub-total	1358.76	1065.25		
	Total	3466.88	2537.52		

The following observations were made in audit:

a) Upflow anaerobic sludge blanket (UASB) technology

UASB technology was useful in treatment of industrial and domestic waste water. Under the project, two UASB plants one each at Kanpur (36 million litre per day) and Mirzapur (14 million litre per day) were to be constructed for treating waste water. Before discharging tannery waste water into the stream, chromium, a hazardous waste, was to be removed by all tanneries. Mid-term evaluation report (February 1992) revealed that out of 151 tanneries in Jajmau (Kanpur), only 26 large tanneries were likely to adopt chromium recovery. The report further revealed that if chromium recovery was not adopted by all tanneries, the performance of UASB system would be affected by chromium and its sludge disposal would be problematic. Details of further developments were not made available. Construction of the plant at Mirzapur is yet to be completed.

b) Post-treatment of effluents from UASB treatment plant at Kanpur

Joint Appraisal Mission for the plant, while recommending post-treatment effluents from the plant to attain GPD standard of sewage cleaning, had also emphasized removal of sulphides and recovery of sulphur before a decision on post-treatment was taken. Since the expert group representing the Dutch Government were of the view that sulphur recovery technology was still in an experimental stage in Netherlands, it was suggested in March 1992 to provide only partial post-treatment and remaining post-treatment would be provided after the plant was constructed and commissioned.

Although the project was started in April 1987, objectives of the project could not be achieved and the project was extended upto December 1993.

(ii) Technical assistance and equipments

The project funded by UK was to attend to sewerage treatment to improve water quality monitoring and modelling and impart training to Indian scientists and engineers and ultimately to improve water quality of the river Ganga at the bathing ghats at Varanasi,Kanpur, Patna and Calcutta.

As on April 1993, the project had been only partially completed and was therefore extended till December 1993. Reasons for this were:

Non-installation of equipment

Four dual fuel engines for utilisation of biogas and generation of power imported in April 1991 at a cost of Rs 568 lakhs were still not installed due to inadequate availability of biogas, slow progress of work by the local contractors etc. In May 1993, MEF requested UK High Commission to explore the possibility of commissioning the engines by using diesel fuel.

Under technical assistance of Thames Water International (TWI), nine water quality monitoring stations were to be set up along the Ganga for continuous monitoring of important water quality parameters. The involvement of TWI in this aspect was to render necessary assistance in testing the equipments and accordingly in June 1990, a TWI expert team

tested the nine equipments which were procured by Central Pollution Control Board (CPCB) out of World Bank aid, and suggested many modifications in the prototype and floating platforms. A mention of this was also made in para 4.1.8(iv) of the Report of the Comptroller and Auditor General of India - No 2 of 1993, Union Government (Scientific Departments). The Ministry in their notes to the Public Accounts Committee in September 1993 stated that only five of the nine stations had been commissioned so far (September 1993).

The present status of equipments valuing Rs 10.84 lakhs received as gift and Rs 2.82 lakhs received on condition that they would be re-exported after six months of their receipt in August 1991 was not available with MEF. No consolidated record of equipments received and their utilisation was produced to Audit for check.

Training details not made available

Detailed training plan was not made available to Audit. Ten officials of GPD were given training (three in water quality monitoring and seven in sewerage and sewage treatment). Three officials were also trained in operation and maintenance of the CCTV system in London and these officials in turn were to give training to other officials in India. No particulars were available of the completion of this aspect.

Defective plan

Although project commenced in 1986, technical inputs required were identified only in February 1989 and no work was carried out until January 1990. Periodicity of the programme was extended four times. Further, project memorandum and side letters for the project were accepted only in November 1990 i.e. three years after commencement of the project.

Detailed review not conducted

Six-monthly reviews were to be conducted alternately in India and UK. The first review covering the works carried out from February 1990 to July 1990 was conducted in London in July 1990 and the second review in Delhi in February 1991. Further, no detailed review as proposed by the UK High

Commission in May 1992 had been conducted so far (June 1993) although the project had been extended upto December 1993.

Materials/equipments received from foreign countries as aid are required to be accounted for. CAA&A, however, had no details regarding receipt of this aid.

C) Strengthening of institutes/laboratories

Grants valuing Rs 7.48 lakhs was received from Swedish International Development Agency **(SIDA)** against an outlay of Rs 674 lakhs for strengthening of Indian Institute of Forest Management **(IIFM)**, Bhopal. For strengthening of CPCB the outlay was Rs 22.19 crores. Details of receipt of aid from Germany were not available.

(i) Strengthening of Indian Institute of Forest Management, Bhopal

For the project: 'Strengthening of IIFM (1988-93)' the Government of Sweden provided a grant of Rs 674 lakhs to develop the Institute as a centre of excellence, offering a wide range of training courses in forest management with a view to developing a non-sectarian multi-disciplinary professionalism based on holistic approach to all forestry related matters among those holding positions of responsibility in the forestry sector. Out of the total aid, SEK 17.8 million (Rs 356 lakhs) constituted the foreign exchange component to be used only for the following purposes:

- visiting long-term faculty,
- long-term net work building,
- international faculty exchange and
- reviews and consultations.

It was decided in a meeting in April 1992 that the completion of the two components viz. visiting long-term faculty and international faculty exchange was not possible. However, a team of officials had visited Europe at the fag end of the project i.e. in February 1993 for which payments were made directly by SIDA. As regards long-term network building, the project completion report indicated that the Institute had not taken any lead in this respect and in a reply to the project completion report, the Institute agreed that its contribution in policy making and collaborations

with other national bodies etc. had been insignificant. The component 'reviews and consultations' was not implemented due to non-formulation of clear cut policy on consultation. In response to the project completion report, the Institute had stated that the consultancy rules would be put up to the Academic Council and to the Board of Governors for approval. The claims of reimbursement from SIDA also did not reveal any expenditure for these purposes. Thus, none of the purposes under the foreign exchange component were implemented.

As regards the other four components, no expenditure was incurred in two components viz. Management Development Programmes (MDP) and Research Fund although estimates for the two were Rs 100 lakhs and Rs 48 lakhs respectively. The project completion report indicated that not a single in-house training programme was organised as contemplated in MDP activity plan and no worthwhile research was conducted. Out of the estimate of Rs 34 lakhs for scholarships for Post Graduate Diploma in Forest Management (PGDFM), a sum of Rs 22.32 lakhs only was spent upto March 1993. A proposal was made in April 1992 for creation of a corpus fund for Rs 120 lakhs for investment in government securities to have annual return of Rs 11 to 12 lakhs for continued payment of scholarships. Although SIDA had agreed to provide Rs 100 lakhs before 31 March 1993, this facility was not availed of due to non-completion of formalities by the Indian authorities. For infrastructural development support, only Rs 59.64 lakhs was incurred as against the estimate of Rs 107 lakhs. Also, a sum of Rs 4.05 lakhs was spent on seminars which was not in the original proposal.

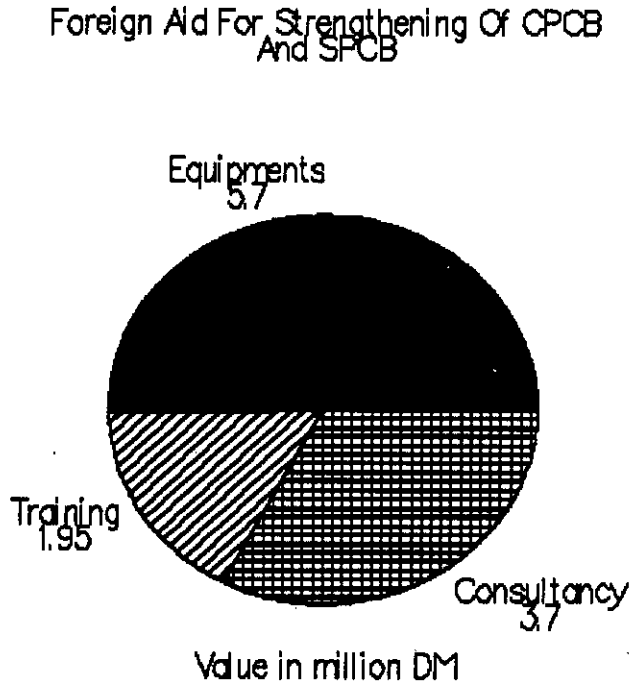
Failure of the project was attributed, in the final evaluation report, to delay in signing the agreement, non-posting of a Director for more than three years, non-delegation of adequate powers to the Director for implementation of the project, lack of unity in the faculty and non-formulation of system of evaluation of the faculty. Also, SIDA delegations expressed that no progress was made ever since the starting of the project and therefore, with the consent of the Government of India, SIDA froze the assistance in February 1990 till a regular Director was appointed and a review of IIFM direction, leadership and management was carried out. Subsequently the unutilised funds for the first three years were returned to 'General pool for development cooperation' between Sweden and India.

Consequently the original aid was scaled down to SEK 12.7 million (Rs 254 lakhs).

Out of the total assistance of Rs 674 lakhs, only Rs 86 lakhs was utilised upto 31 March 1993 and reimbursement was received for only Rs 7.48 lakhs upto March 1993.

(ii) Strengthening of Central and State Pollution Control Boards laboratories

The project was to improve the Pollution Control Board laboratories and to train their staff.



Equipments not utilised

A major objective of the project was to provide appropriate analytical instruments to four regional laboratories and five State Board laboratories. Equipments were supplied in February 1988 although the project was started in 1985. Out of 55 equipments in the laboratories at Delhi, Calcutta and Baroda, 10 were not installed, 12 were not in working

condition and 12 were not utilised to their full capacity. Details in respect of the other laboratories were not available. First review conducted by MEF in August 1990 indicated that working of the equipments including laboratories was not satisfactory. World Bank appraisal mission had also reported non-utilisation of equipments and lack of quality control. Further, two mobile emission monitoring units procured in phase I were not put into operation due to inadequate adjustment to Indian conditions and non-functioning of software.

MEF stated in December 1993 that the delay in delivery of the equipments was due to time taken for evaluating the need of different laboratories based on the mandatory task to be performed by them, getting exemption from customs duty, delay by the German counterpart in finalisation of the equipments, development of infrastructure for installation of equipments and training of personnel. Further, MEF agreed that some of the equipments could not be made operational because of missing accessories while some others could not be utilised due to lack of trained personnel. MEF also stated that the required accessories/defective instruments were repaired locally and adequate training programmes were organised to enhance the capability of the persons. As regards mobile air quality monitoring vans, MEF stated that the vans provided in August 1988 were put into operation from the second half of 1992.

Training targets not met

During phase II, 30 scientists of Central/State Boards were to be trained in operation and maintenance of air and water monitoring equipments and the analytical instruments for heavy metal and toxic organics in India and an intensive programme for two engineers in Germany was also proposed. Progress review report of July 1992 revealed that training in instrumental analysis and data management was conducted for 88 expert-months (EM) as against the schedule of 96 EM and besides an on-the-job training programme involving approximately 120 EM was also organised.

MEF stated in December 1993 that as against 96 man-months, training of 40 man-months was imparted in Germany and another 120 man-months in India during phase II and its extended duration. MEF, however, did not mention the number

of scientists trained and whether the intensive training was provided in Germany.

Consultancy provision not fully utilised

Short-term consultancy covering 60 man-months in the areas of specification for instruments, assembly of instruments, training of laboratory staff, seminars and workshops was proposed during phase I and 40 man-months was provided in phase II for other areas of consultancy such as establishment of system for analytical quality control, measurement and monitoring of ambient air pollutants, water pollutants, preparation of hand book to introduce uniform procedure in all laboratories for sampling, preservation etc.

It was observed that 15 man-months of consultancy were not availed of during phase I due to which the guidelines for laboratory equipments and environmental planning could not be prepared. CPCB, however, admitted that the shortfall was due to over-estimation of requirements of short-term consultants and that this had been accordingly reduced in phase II. MEF stated in December 1993 that as against 55 man-months of consultancy available in phase II including the unutilised 15 man-months in phase I, 67 man-months services of foreign expert and 35 man-months of Indian expert were provided. MEF was, however, silent about the consultancy in the areas of technology for waste gas purification systems, emission standards for hazardous industries and chemical plants and safety analysis which were not realised though listed out in the project planning matrix.

Delay in utilisation

Phase I of the project which was to be completed between September 1985 to August 1988 was extended upto March 1989 due to shortfall in short-term consultancy and performance tests on highly sophisticated analytical instruments. Phase II with the schedule: April 1989 to March 1992 was extended upto December 1992 due to various reasons like delay in getting the action plan approved, delay in arrival of second long-term expert for the laboratory management, translation of guidelines for the designs of the conveyance system and pollution control system. According to German expert, phase II was behind schedule by about nine months due to lack of

quality control, mid-term change in the perception of the project and lack of an effective support system.

Project progress review report also revealed that non-achievement of the objectives was due to objectives being too ambitious, shortage of laboratory space, lack of administrative assistance from German Technical Cooperation Agency's head office, CPCB not finding its role as a Central institution, lack of coordination, CPCB not having Chairman for a year, lack of clarity in the planning, non-availability of updated project planning matrix and insufficient trained laboratory personnel.

The following activities which did not form part of the original programme were also undertaken:

- consultancy in environmental planning and evaluation of new industries,

- consultancy in effluent treatment from industrial areas,

- organisation of a workshop on environmental protection planning and implementation in industrial areas, and

- consultancy to MEF on management of hazardous wastes.

Thus, the results set out in the original plan could not be achieved in full measure and thereby objectives were not achieved.

While agreeing with Audit, MEF stated in December 1993 that the activities in which the objectives have not been fully achieved have been taken as continued activity in phase III of the project.

Materials/equipments received from foreign countries as aid are required to be accounted for in the books of the Government and the projects. CAA&A, however, had no details regarding receipt of the materials and equipments under this aid agreement.

D) R&D in Non-Conventional Energy Sources

External aid in the form of grant valuing Rs 11.52 crores was received from UNDP and USAID for the projects (i)

Development of amorphous silicon solar cells (Rs 8.46 crores), (ii) R&D studies on woody bio-mass species for arid marginal lands (Rs 1.65 crores) and (iii) Production of woody bio-mass under sub-standard soils (Rs 1.41 crores) respectively during the period 1984-92.

(i) Development of amorphous silicon solar cells

The project objectives were to upgrade the existing facility at the Indian Association for Cultivation of Science (IACS), Calcutta, to develop capacity for analysis and calibration required for fabrication of commercially producible thin film solar cells, to develop state-of-the-art process techniques and devise structures for amorphous silicon solar cells for use in the pilot plant and to analyse and characterize the material produced in the pilot plant.

The project was sanctioned for IACS for the period November 1987 to July 1992 with an outlay of Rs 54.86 lakhs for 1987-90 and Rs 67.25 lakhs for April 1990 to July 1992. Due to delay in receipt and commissioning of the multi-chamber-CVD, the work on multi-junction cells had suffered a delay of more than a year and hence the scheme was extended up to June 1993 with an additional input of Rs 11.89 lakhs. Further extension upto December 1993 was also given with an additional outlay of Rs 10 lakhs in order to keep the staff engaged and to continue the research work and also to maintain the sophisticated laboratory equipments till the proposed phase II of the project was finalised and approved. The Government of India input for the project up to 31 March 1993 was Rs 133.91 lakhs of which Rs 119.50 lakhs had been utilised upto 31 March 1993.

UNDP inputs were to be used in the form of professional development, expert consultations and supply of equipments.

Non-commissioning of equipments

Equipments worth Rs 642.52 lakhs were delivered but the transient photo conductivity measurement facility worth Rs 15.30 lakhs remained unutilised due to short supply of supporting items worth Rs 6.12 lakhs. This affected the progress in characterisation of materials.

Delay of more than a year in commissioning of the multi-chamber plasma-CVD system affected the work on multi-

junction cells. The equipment was received in damaged condition and insurance claims for Rs 61.2 lakhs though agreed to, had not yet been settled (March 1993). Safety equipments had also not been supplied.

Non-transfer of technology to pilot plant

Project performance evaluation report prepared by UNDP in February 1993 showed that during commissioning of the plant the process know-how generated at IACS could be transferred only partially due to urgency of reaching commissioning goals. It was noticed that the specifications for an optimized single junction cell which might be produced in the plant without major modification would be completed and handed over to the plant through MNES within the duration of the present project (June 1993).

Inadequate production of solar cells

Technical Report of March 1993 of the United Nations Industrial Development Organisation **(UNIDO)** revealed that the amorphous silicon pilot plant constructed and commissioned in September 1992 for commercial production of 500 KW of solar cells modules per year had encountered a number of difficulties during start up. The pilot plant in its present state, was probably only capable of producing about 20 to 30 KW per year, an output far short of expectations, and time required to bring the pilot plant into successful mode may be longer than desired.

Proposal for phase II of the project to upgrade the existing facilities of the technology for a period of five years with the assistance of US $ 695000 and Indian input of Rs 172 lakhs though submitted to MNES had not been approved as of July 1993.

MNES stated (January 1994) that UNDP had arranged the supply of supporting items for transient photo conductivity measurement facility. Issue of insurance claim for multi-chamber plasma-CVD system had been taken up by UNDP and safety equipments were being supplied. The pilot project team is expected to demonstrate stabilised plant performance utilising IACS technology inputs by March 1994 and efforts are continuing to improve the pilot plant further to a level of one module for every three minutes instead of five minutes to generate around 5W of output per module.

(ii) R&D studies on woody bio-mass species for arid marginal lands

Project objectives were to identify species that could be used in arid lands, develop large scale production of seeds and soil testing and nutrient replacement strategies.

The project was funded by USAID for Rs 165.22 lakhs of which equipment constituted 44.26 *percent*, technical assistance 13.15 *percent*, training 34.63 *percent* and contingencies 7.96 *percent*. Apart from this, Indian input of Rs 18.28 lakhs had also been invested and fully utilised in the project upto 31 March 1993.

The project was approved for the period 1984-87 but on the basis of the final technical report submitted by the principal investigator, it was extended upto July 1992. However, till August 1993 there was no information on status of achievement of the project objectives although asked for by the MNES in April 1993.

(iii) Production of woody bio-mass under sub-standard soils

The project was to characterize indigenous tree species for bio-mass production, determine growth response of selected tree species on sodium alkaline soils and conduct a nursery technology workshop with MNES and Madurai Kamaraj University/Bharathidhasan University, Trichy (Tamil Nadu) **(MKU/BU)** and assistance of USAID. National Botanical Research Institute **(NBRI)**, Lucknow was the implementing agency. The project was funded by USAID for a total value of Rs 140.74 lakhs of which equipment constituted 55.43 *percent*, technical assistance 20.43 *percent*, training 17.40 *percent* and contingencies 6.74 *percent*. Apart from this, Indian input of Rs 29.08 lakhs had been invested upto 31 March 1993. Project formulation was originally done in December 1984 and revised in October 1986. Due to delay in supply of equipment and as plants required more gestation period before further analysis could be done, the project had to be extended upto March 1992 and then again upto December 1992. Project completion report had not yet been received (June 1993).

E) Projects relating to utilisation of imported equipments

External aid in the form of grant valuing Rs 93.57 crores was received from Denmark during 1987-92 for the projects (i) Windmill farms (Rs 90.42 crores) and (ii) Solar thermal ice pack freezers and milk chilling plants (Rs 3.15 crores).

(i) Windmill farms (20 MW)

DANIDA was to supply equipment to set up three windmill farms to produce electricity, in collaboration with State Governments of Gujarat and Tamil Nadu. The project was completed but objectives had not been fully achieved due to operational problems. Apart from aid received from external sources, Indian input of Rs 11.98 crores by State Government agencies and Rs 0.93 crore by MNES had also been invested upto 31 March 1993.

Targeted output of the three windmill farms and achievement was as follows:

Name of the farm	Energy output Mwh/ year	Target till July 1993 (KWH)	Achievement till July 1993 (KWH)	Achievement in percentage
Lamba(Gujarat) (10 MW) (from May 1990)	1880	61100000	40735640	66.67
Kayathar (Tamil Nadu) (6 MW) (from February 1990)	2460	51660000	40033381	77.49
Muppandal (Tamil Nadu) (4 MW) (from April 1990)	2740	36533333	34097081	93.33

In Tamil Nadu, Kayathar and Muppandal, the farms were commissioned in January 1990 and March 1990 respectively. As on August 1993, problems concerning lightning arrestors, tacho-generators, central monitoring and control system (CMCS), supply of spares, use of Indian gear oil and main grease bearing were still existing in the operation of these

windmill farms. The contractor representing DANIDA refused to remedy the defects when asked in January 1993. In December 1992, Tamil Nadu State Electricity Board(**TNEB**) had informed MNES that the project would fail unless the rate of failure of tacho-generator could be reduced. In this connection, TNEB stated that against their request to DANIDA for spares for five years of 200 tacho-generators, they had received only 10 and no supply against 12 other spares.

Lamba Windmill farm had been commissioned in April 1990. Poor grid condition at Lamba created problems in generation and the windmill farm had to be shut down in June 1990 to prevent damage to wind turbine. Lightning arrestors were also not working. MNES found in July 1990 that the problems had arisen mainly on account of voltage and frequency variations that had been provided by VESTAS (representative of DANIDA) on wind turbine contrary to the specifications. This was rectified by VESTAS in September 1990. In their summary report in August 1990 Consolidated Energy Consultant had pointed out the following major reasons for unsatisfactory working of wind farms:

- wide voltage variation and frequent tripping of electricity;

- system frequency being occasionally above 51 cycles, turbine control circuit trips; and

- frequent failure of 11 KV lightning arrestors provided by Gujarat Electricity Board **(GEB)** and LV panel lightning arrestors provided by VESTAS.

In March 1993, GEB explained to MNES that if grid condition is to be improved a second 66 KV line would have to be provided from the sub-station to Lamba wind farm; this could be done if Gujarat Energy Development Agency **(GEDA)** was ready to pay the charges of Rs 63 lakhs. For reduced asymmetry of load, detailed study between GEDA and GEB would have to be done. However, problems regarding slide bearings, software, repairs of crane and strengthening of grid were still continuing (August 1993).

It was also noticed in audit that though the project had not been approved by Planning Commission till date, agreement between DANIDA and DEA was signed in December 1987. This was because the Planning Commission had expressed certain

reservations in August 1987, May 1989 and August 1989 on its part regarding:

- suitability of the imported technology for indigenous conditions and absence of provision for technology transfer,

- non-submission by MNES of the formal proposal containing details of physical and financial requirements, and

- shortage of Plan funds required for meeting local costs by State Governments.

As a result of this, an amount of Rs 34.12 crores being the rupee equivalent of foreign aid (DKR 146950019.72) received, had not been adjusted which was against prescribed procedure. Aid received in any form was to be routed through CAA&A. In the absence of a budgetary provision, accounting could not be completed and amount had not been adjusted. CAA&A had been requesting MNES since December 1990 to deposit this amount in the RBI account. However, this amount was not available in MNES budget because the Planning Commission had not approved this project (March 1993).

MNES stated in January 1994 that actual performance of the project is almost in accordance with the projected output, corrective action is continuously being taken to improve the capacity utilisation at Lamba wind farm and main objective of demonstrating the technology has been achieved and that MNES had ever since been pursuing the matter with the Planning Commission regarding their formal clearance but this has not been accorded as yet.

(ii) Solar thermal ice pack freezers and milk chilling plants

DANIDA was to supply and install 10 solar thermal ice pack freezers and three solar thermal milk chilling plants in different places in India for field evaluation, and research and demonstration were to be done during June 1987-December 1990.

Equipments after clearance of customs were received in India in November-December 1987. Out of the three milk chilling plants, installation was completed only at Wardha and not at the other two places due to damage to collectors. At Wardha also, the system was leaking after installation and damaged collectors were returned in December 1988 to Denmark for repair/replacement. The collectors along with additional items were received in March-April 1990 after disbursement of Rs 7.06 lakhs to DANIDA Mission towards customs duty, freight, insurance and warehousing charges. Out of the 10 ice pack freezers, two each in Maharashtra and Rajasthan and one each in Uttar Pradesh and Tamil Nadu were installed but remained idle due to technical faults and could not be repaired/replaced. The other four freezers were also not installed.

In November 1991, DANIDA suggested closure of the project due to inordinate delays in commissioning the plant and non-availability of import permits.

In November 1992, MNES recorded the following reasons while closing the project:

- technology did not prove viable in the Indian climate; and

- consequent on closure of the supplier company in Denmark, no one could undertake responsibility for installation, commissioning, monitoring and replacement of sub-components.

Equipments already received in India were to be disposed off and an amount of Rs 7.06 lakhs spent on customs duty had become infructuous.

Accepting the facts MNES stated in January 1994 that payment of customs duty was made after consulting the Department of Revenue and it was decided to dispose off the material in the best possible way.

Materials/equipments received from foreign countries as aid are required to be accounted for in the books of the Government and the project. CAA&A, however, had no details regarding receipt of materials and equipment under this aid agreement.

(T.N.THAKUR)
Principal Director of Audit
Scientific Departments

New Delhi
The 24 MAR 1994

Countersigned

(C.G.SOMIAH)
Comptroller and Auditor
General of India

New Delhi
The 24 MAR 1994

Appendix I

Grants paid to Autonomous Bodies
(Reference - Paragraph No. 1.1.14)

S. No.	Ministry/Department Name of Body	Amount of grants received in 1992-93
		(Rs in crores)
	Department of Atomic Energy	
1.	Tata Memorial Centre, Bombay	23.28
2.	Saha Institute of Nuclear Physics, Calcutta	7.20
3.	Institute of Physics, Bhubaneswar	3.55
4.	Atomic Energy Education Society's School, Bombay	1.95
5.	Tata Institute of Fundamental Research, Bombay	0.41
	Total	36.39
	Department of Electronics	
6.	Centre for Development of Advance Computing, Pune	3.92
7.	Society for Applied Microwave Electronics Eng. Research, Bombay	3.28
8.	Electronic Research and Development Centre, Calcutta	1.35
9.	National Centre for Software Technology, Bombay	0.90

10.	Centre for Electronics Design and Technology, Imphal	0.46
11.	Centre for Electronics Design and Technology, Aurangabad	0.25
12.	Centre for Electronics Design and Technology, Srinagar	0.10
	Total	10.26

Department of Environment, Forests and Wildlife

13.	Central Pollution Control Board, New Delhi	7.14
14.	Indian Institute of Forest Management, Bhopal	3.01
15.	Wild Life Institute of India, Dehradun	2.83
16.	Society for Promotion of Wasteland Development , New Delhi	1.39
17.	Central Zoo Authority of India, New Delhi	0.75
18.	Padmaja Naidu Himalayan Zoological Park, Darjeeling	0.06
	Total	15.18

Department of Science and Technology

19.	Sree Chitra Tirunal Institute of Medical Sciences and Technology, Trivandrum	9.86
20.	National Institute of Immunology, New Delhi	8.08

21.	Raman Research Institute, Bangalore	4.50
22.	Bose Institute, Calcutta	3.79
23.	Indian Institute of Tropical Meteorology, Pune	2.97
24.	Indian Association for Cultivation of Science, Calcutta	4.09
25.	Indian Institute of Astrophysics, Bangalore	5.49
26.	Indian Institute of Geomagnetism, Bombay	2.10
27.	Indian National Science Academy, New Delhi	2.10
28.	Birbal Sahni Institute of Palaeobotany, Lucknow	2.08
29.	Wadia Institute of Himalayan Geology, Dehradun	1.94
30.	S.N.Bose National Centre for Basic Sciences, Calcutta	1.75
31.	Maharashtra Association for Cultivation of Science, Pune	1.49
32.	Indian Academy of Science, Bangalore	0.30
	Total	50.54

Department of Space

33.	National Remote Sensing Agency, Hyderabad	12.60

34.	Physical Research Laboratory, Ahmedabad	10.26
	Total	22.86
	Department of Agriculture Research and Education	
35.	Indian Council of Agricultural Research, New Delhi	350.08
	Total	350.08
	Ministry of Health & Family Welfare	
36.	Indian Council of Medical Research, New Delhi	48.55
	Total	48.55
	Department of Scientific and Industrial Research	
37.	Council for Scientific and Industrial Research, New Delhi	261.77
	Total	261.77
	Department of Telecommunications	
38.	Centre for Development of Telematics (C-DOT)	29.00
	Total	29.00
	Grand Total	**824.63**

Appendix II

Positions of Accounts not submitted to Audit
(Reference - Paragraph No. 1.1.14)

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	1991-92	1992-93
2.	Tata Memorial Centre, Bombay	1991-92	1992-93
3.	Atomic Energy Education Society's School, Bombay	1991-92	1992-93
4.	Saha Institute of Nuclear Physics, Calcutta	1991-92	1992-93
5.	Institute of Physics, Bhubaneswar	1991-92	1992-93
	Department of Space		
6.	Physical Research Laboratory Ahmedabad	1991-92	1992-93
	Department of Electronics		
7.	Centre for Electronics Design and Technology, Aurangabad	1991-92	1992-93
8.	Centre for Electronics Design and Technology, Srinagar	1986-87	1987-88 1988-89 1989-90 1990-91

			1991-92 1992-93
9.	Society for Applied Microwave Electronics Engineering Research, Bombay	1991-92	1992-93
10.	National Centre for Software Technology	1991-92	1992-93
11.	Electronic Research and Development Centre, Calcutta	1991-92	1992-93
12.	Centre for Development of Advance Computing , Pune	1991-92	1992-93
	Department of Science and Technology		
13.	Indian Institute of Geomagnetism, Bombay	1990-91	1991-92 1992-93
14.	Bose Institute, Calcutta	1991-92	1992-93
15.	Maharashtra Association for Cultivation of Science, Pune	1990-91	1991-92 1992-93
16.	National Institute of Immunology, New Delhi	1991-92	1992-93
	Department of Environment, Forests and Wildlife		
17.	Padmaja Naidu Himalayan Zoological Park Society, Darjeeling	1990-91	1991-92 1992-93
18.	Central Pollution Control Board, New Delhi	1991-92	1992-93

Appendix III

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 1993	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	391	5886.98
	1989-90	362	6203.39
	1990-91	376	6206.98
	1991-92	420	6920.20
	Total	2879	38406.44
Environment and Forests	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

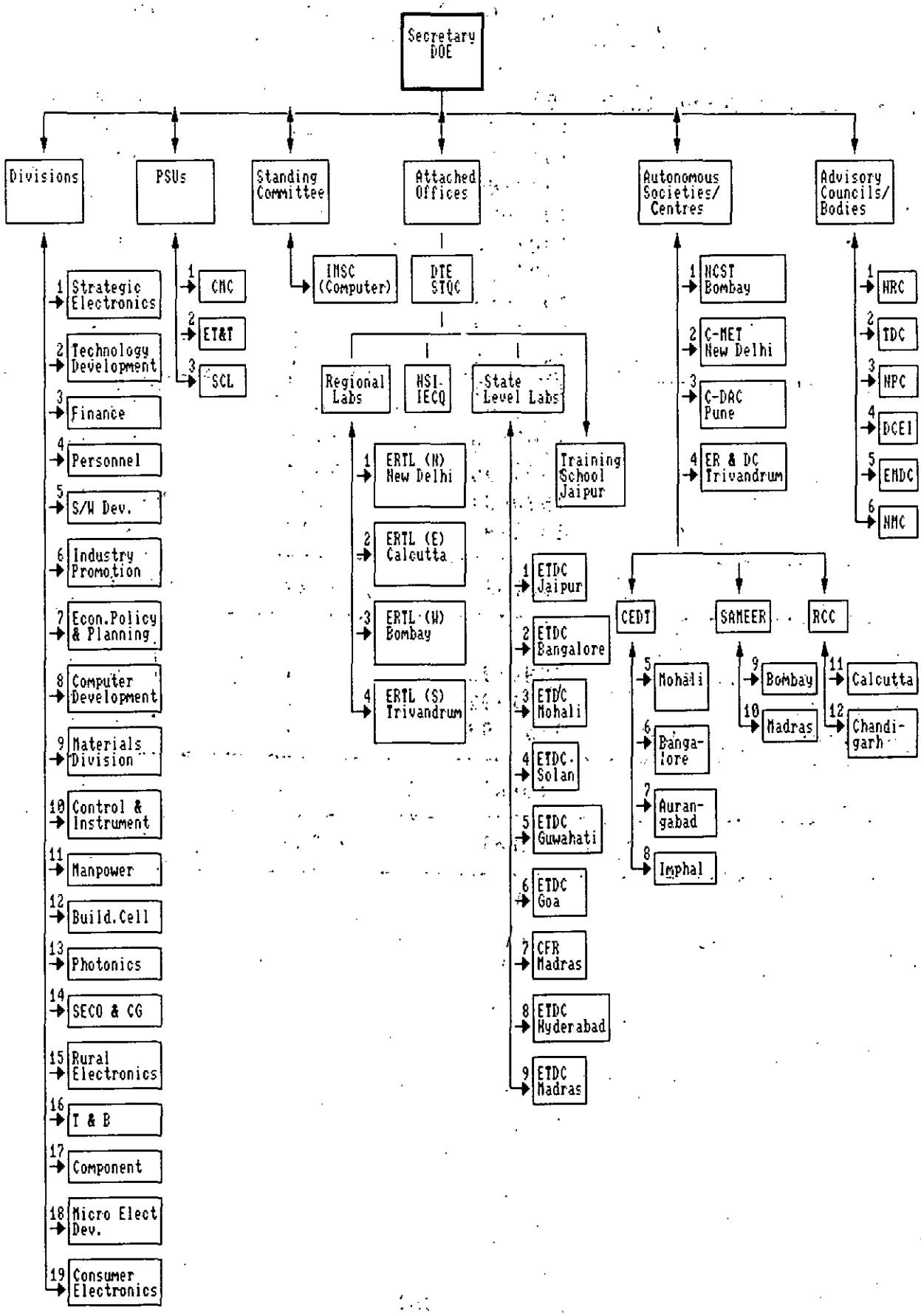
	1990-91	178	304.44
	1991-92	113	1749.30
	Total	3964	15293.13
Non-Conventional Energy Sources	1983-84	157	220.00
	1984-85	326	691.00
	1985-86	374	759.00
	1986-87	361	1353.00
	1987-88	600	2792.00
	1988-89	710	1514.00
	1989-90	660	1612.00
	1990-91	318	2011.00
	1991-92	170	633.00
	Total	3676	11585.00
Ocean Development	1983-84	27	251.02
	1984-85	33	34.00
	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
	1991-92	-	-
	Total	579	2709.65
Space	1976-77	1	0.05
	1977-78	1	0.15
	1978-79	2	0.08
	1979-80	3	0.33
	1980-81	5	0.72
	1981-82	8	5.56
	1982-83	24	7.69
	1983-84	24	11.73
	1984-85	42	14.08
	1985-86	25	9.04
	1986-87	25	10.41
	1987-88	24	12.53
	1988-89	16	13.82
	1989-90	25	28.23

	1990-91	19	28.61
	1991-92	28	48.08
	Total	272	191.11
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	607	745.00
	1983-84	604	520.00
	1984-85	716	1357.00
	1985-86	858	1397.00
	1986-87	1327	2068.00
	1987-88	1983	2538.00
	1988-89	1441	3051.00
	1989-90	2092	3807.00
	1990-91	1926	5161.00
	1991-92	1910	8041.00
	Total	14549	30432.00
Geological survey	1990-91	1	0.10
of India	1991-92	7	0.75
Department of Mines	1992-93	7	0.55
	Total	15	1.40
	Grand Total	25934	98618.73

Appendix IV

Organisation chart of Department of Electronics

(Reference- Paragraph NO.4.1.5)



Appendix V

Discrepancies between stores issued by NIC and those accounted for by State Informatics Centres (Reference - Paragraph No. 8.1.8)

Name of State Informatics Centre	Items	Nos. issued as per NIC record	Nos. accounted for by S.I.C.	Difference
(1)	(2)	(3)	(4)	(5)
Uttar Pradesh State Informatics Centre, Lucknow	HCL Dumb Terminals	242	238	- 4
	Multilingual Terminals	61	74	+ 13
	Dot Matrix printers	48	63	+ 15
	Stabilizers	104	102	- 2
	Super A/T (386)	47	61	+ 14
	Modems	27	45	+ 18
	Alwyn economic tables	174	186	+ 12
	Tables without drawers	136	168	+ 32
Himachal Pradesh State Informatics Centre, Simla	Air-conditioners	8	14	+ 6
	Bilingual Gist Terminals	41	48	+ 7
	Line Drivers	6	2	- 4

	Multitech Modems	2	12	+ 10
	132 Col. Printers	25	34	+ 9
State Informatics Centre, Bhubaneshwar	MES - 200	14	15	+ 1
	Laser Printer	1	2	+ 1
	MRO-Tek Line Drivers	2	32	+ 30
	132 Col. Dot Matrix Printers	8	34	+ 26
	NEC Printers and Printers			
Regional Informatics Centre, Western Region, Pune	VT-100 Terminals	297	567	+ 270
	Multilingual Terminals VT-100	16	115	+ 99
	PC/AT	1	NIL	- 1
	Printers	2	NIL	- 2
	TVS Printers	NIL	35	+ 35
	EX-1000 Printer	1	NIL	- 1
	Super PC-AT	10	NIL	- 10
State Informatics Centre Bihar, Patna	MES	41	40	- 1
	HCL DTN Key Board	158	166	+ 18

Appendix VI

Trends in re-appropriation of funds
(Department of Science and Technology)
(Reference - Paragraph No. 9.2)

Head	Year	Original grant	Final grant	Actual	Reasons for excess or saving indicated by the Department
(1)	(2)	(3)	(4)	(5)	(6)
		(Rs in lakhs)			
2711 Flood	1988-89	50	5	3.08	Non-creation/filling of posts.
Control and	1989-90	50	36	35.27	-do-
Drainage	1990-91	200	85.48	86.74	-do-
3425 B-	1988-89	905	611.64	574.99	Non-creation/filling of posts.
Other Scientific					and non-procurement of stores.
Research B.1	1989-90	892	462	461.52	-do-
Survey of India	1990-91	820	471.09	468.72	-do-
B.1(6) Other	1991-92	682	617.43	580.65	-do-
Expenditure B1	1992-93	697.39	679.58	665.88	-do-
(6)(1) Other		+ 75.16			
Schemes		(Supplementary)			
B2(2)(2)(2)	1990-91	825	1220	1233.32	Funding more number
Multi-disciplinary Research					of projects than anticipated.
in Science and					
Technology(SERC)	1991-92	1150	1300	1305.03	-do-
	1992-93	1200	1400	1400.79	-do-
C2(2)(3)(3)	1988-89	265	130	125.91	Less number of proposals
Atmospheric					supported
Science	1989-90	180	110	125.49	Non-finalisation of 38 agromet field units.
B2(2)(5)(3)	1990-91	176	74	72.62	Economy measures
Support to Technology					
Missions	1991-92	150	40	39.32	Savings mobilised to cater to other R&D work

	1992-93	50	5	2.62	Less number of projects qualifying for release.
B2(3)(1) National Centre for Medium Range Weather Forecasting Centre (NMRWFC)	1988-89	900	50	49.54	Diversion of funds from revenue to capital for setting up National Centre for Medium Range Weather Forecasting.
	1989-90	577	236	239.77	Economy measures/
	1990-91	357	303.10	285.05	Non-filling of vacant posts and non-receipt of bills from suppliers.
	1991-92	432	489.22	372.29	Non-filling of vacant posts and non-receipt of electricity and water bills.
	1992-93	689.40	528.89	501.32	Non-filling of posts and non-receipt of meterial and supplies.
B2(4)(1)(1) Domestic Travel	1989-90	50	25	20.58	Less tours undertaken than anticipated.
	1990-91	50	43.02	22.92	-do-
	1991-92	75	30	28.77	-do-
	1992-93	75	23	21.59	-do-
B2(4)(1)(2) Travel abroad	1989-90	50	35	32.85	-do-
	1990-91	50	30	18.41	-do-
	1991-92	75	12	13.09	-do-
	1992-93	75	30	19.52	-do-
5425 BB Capital Outlay on other Scientific & Environment Research	1988-89	15	NIL	NIL	Non-execution of project by CPWD.
	1989-90	50	6	NIL	Economy measures. Amount was not claimed by CPWD.
BB1(1) Survey of India	1990-91	20	9.46	7.39	-do-
BB1(1)Building					
BB1(1)(1) Buildings Air-conditioning					
AA2(2)(1) Building	1988-89	35	-	-	Non-taking up of work by CPWD
Digital	1990-91	5	5	-	Non-receipt of claim from CPWD
Mapping Systems	1991-92	20		-	-do-

(NATMO)	1992-93	40	NIL	-	-do-
BB2(2)(2)	1989-90	65	-	-	Economy measures
Equipment	1990-91	65	16	15.46	
	1991-92	71	20	4.26	
AA2(3)(1) Land and Building construction	1989-90	220	1052	1034.52	Full payment of cost of land for campus at Noida
modification air-conditioning and uninter-	1990-91	305	626	625.60	Payment for development charges of land
rupted power supply	1991-92	580	50	26.80	Delay in construction work.
	1992-93	600	361.00	56.33	Slow progrss of construction.
AA2(3)(2) Equipment	1988-89	1428 (Supple-mentary)	1702.41	1701.18	More expenses for setting up of centre
	1989-90	403	-	10.15	Non-procurement of equipment for telecom.
	1990-91	350	-	-	-do-
	1991-92	250	956.00	937.17	Actual cost of upgradation for super computer.
	1992-93	120	50.00	24.59	Delay in develop-ment of V-SAT.
5455					
CC-Capital outlay on	1988-89	470	84.18	71.07	Non-receipt of radars
Meteorology	1989-90	940.50	551.59	407.46	Non-receipt of
CC1-Satellite					equipment
services	1990-91	1118.50	641.03	646.84	Economy measures
CC1(1)Equipment	1991-92	632.00	1334.56	1387.67	To cater the actual cost of equipment of INSAT,I-B
BB2	1988-89	1229.20	555.95	475	Receipt of equipment
Observatories and weather stations					against orders placed last year.
BB2(1)	1989-90	1115.80	898.80	940.28	Economy measures
Equipment	1990-91	691.30	611.52	593.26	-do-
	1991-92	1383.00	417.20	404.60	Non-receipt of equipment
	1992-93	1417.00	704.25	656.77	Non-finalisation of contract

CC-3					
Other Meteoro-	1989-90	129.70	89.61	50.90	Non-finalisation of contract
logical					
Services	1990-91	190.20	91.50	96.57	Economy measures
CC 3(1)	1991-92	410.00	30.83	30.33	Non-receipt of
Equipment					equipment.
4711					
AA - Capital					
outlay on Flood					
Control Project					
AA1 Flood Control					
AA1(1)					
Other expenditure					
AA1(1)(1)	1990-91	150	-	-	Economy measures
Building					
AA1(1)(2)					
Machineries &	1990-91	50	8.15	5.76	Economy measures
Equipment					

Savings/excess after re-appropriations
(Department of Science and Technology)
(Reference - Paragraph No 9.2)

Head	Year	Original grant	Final grant	Actual	Savings(-)/ Excess(+)
(1)	(2)	(3)	(4)	(5)	(6)
		(Rs in lakhs)			
3425-C Other Scientific Research					
C-2(2)- Assistance to other Scientific Bodies					
C-2(3)(4) Centre for Science & Technology for Developing Country	1988-89	25	10	4.79	(-)5.21
3455					
D-Meteorology	1988-89	2013	1718.86	1697.39	(-)21.47
D-4 Observatories and Weather Stations					
5455					
BB-Capital Outlay on Meteorology	1988-89	470	84.18	71.07	(-)13.11
BB1-Satellite Services					
BB1(1)-Equipment					
BB2-Observatories and Weather station					
BB2(1)-Equipment	1988-89	1229.20	555.95	475.00	(-)80.95
3425					
C1 (3)-Surveys of developmental projects	1989-90	1406	1452	1437.37	(-)14.63
C2(2)(2)(2) Multi-disciplinary Research in Science & Engineering(SERC)	1989-90	825	951	995.32	(+)44.32
C2(2)(3)(3) Atmospheric Sciences	1989-90	180	110	125.49	(+)15.49
C2(2)(7)(6) Initiation of Technology Missions	1989-90	325	153	127.79	(-)25.21
C-2(4)(1) Scientific Departments abroad	1989-90	66	99.42	82.66	(-)16.76

C2(4)(4)(3) Other expenditure (Including equipment)	1989-90	200	312	263.69	(-)48.31
5425-BB Capital outlay on other scientific and environmental Research					
BB2(3)(2) Equipment	1989-90	403	nil	10.15	(+)10.15
5455-CC Capital outlay on Meteorology					
CC1(1) Equipment	1989-90	940.50	551.59	407.46	(-)144.13
CC2(1) Equipment	1989-90	1115.80	898.80	940.28	(+)41.48
CC3(1) Equipment	1989-90	129.70	89.61	50.90	(-)38.71
3425					
C2(2)(2)(3) Multi-disciplinary Research in Engineering (SERC)	1990-91	360	382	355.19	(-)26.81
C2(2)(3)(2) Other expenditure for super-conductivity research	1990-91	580	210	196.47	(-)13.53
C2(2)(3)(3) Instrument development	1990-91	132	60	49.90	(-)10.10
C2(2)(6)(2) Cryogenic Composites Ceramics Bio and other materials	1990-91	95	60	46.37	(-)13.63
C2(2)(6)(4) Technology promotion & consumer protection	1990-91	35	19	9.01	(-)9.99
C2(3)(1) National Centre for Medium range weather forecasting (NCMRWF)	1990-91	357	303.10	285.05	(-)18.05
C2(4)(1)(1) Domestic Travel	1990-91	50	43.02	22.92	(-)20.10
C2(4)(1)(2) Travel abroad	1990-91	50	30	18.41	(-)11.59
C2(4)(1)(3) Other expenditure (including equipment)	1990-91	600	320	331.41	(+)11.41
5455					
CC2(1) Equipment	1990-91	691.30	611.52	593.26	(-)18.26
3425					
C1(6) Other expendiutre					
C1(6)(1) Other scheme	1991-92	682	617.43	580.65	(-)36.78

C2(2)(1)(5) Indian Institute of Astrophysics, Banglore	1991-92	434	423	408	(-)15.00
C2(3)(1) National Centre for Medium Range Weather forecast (NCMRWF)	1991-92	432	489.22	372.29	(-)116.93
C2(4)(1)(3)Other expenditure (including equipment)	1991-92	1350	413.00	394.80	(-)18.20
5425					
B82(2)(2) Equipment	1991-92	71	20	4.26	(-)15.74
B82(3)(1) Land and Building construction, modification & air-condtitioning and uninterrupted power supply	1991-92	580	50	26.80	(-)23.20
5455					
CC1(1) Equipment	1991-92	632	1334.56	1387.67	(+)53.11
3425					
B1(6) Other expenditure					
B1(6)(1) Other schems	1992-93	697.39+ 75.16 Supplementary	679.58	665.88	(-)13.70
B2(2)(6)(4) Science & Technology Entrepreneurship Development and Employment generation	1992-93	300	330.00	305.04	(-)24.96
B2(3)(1) National Centre for Medium Range Weather Forecasting (NCMRWF)	1992-93	689.40	528.89	501.32	(-)27.57
B2(4)(1)(2) Travel abroad	1992-93	75	30	19.52	(-)10.48
3455					
C3-Satellite services	1992-93	598.37 1.00 Supplementary	561.50	504.37	(-)57.13
C6-Other Meteorological Services	1992-93	1221.31 +62.49 Supplementary	1257.69	1272.32	(+)14.63

5425						
AA2(3)(1)	Land & Building construction modification & air-condtitioning and uninterrupted power supply	1992-93	600	361	56.33	(-)304.67
AA2(3)(2)	Equipment	1992-93	120	50	24.59	(-)25.41
5455						
BB1(1)	Equipment	1992-93	423	385.25	304.47	(-)80.78
BB2(1)	Equipment	1992-93	1417	704.25	656.77	(-)47.48
BB3(1)	Equipment	1992-93	310	260.50	385.00	(+)124.50

Appendix VIII

Surrender of funds in the last week of financial year
(Department of Science and Technology)
(Reference - Paragraphs No 9.2)

Head of original grant	Year	Original	Actual	Surrender	Percentage
(1)	(2)	(3)	(4)	(5)	(6)
			(Rs in lakhs)		
2711-B Flood Control & Drainage	1988-89	50	3.08	45(-)	90
3425-C Other Scientific Research					
C-2(2)- Assistance to other Scientific Bodies					
C-2(2)(3)(3) Drought Mitigation Programme	1988-89	200	-	200	100
C-2(2)(3)(4) Medium Range Forecasting Centre	1988-89	900	49.54	850	94
C-2(2)(1)(4) Plasma Physics	1988-89	440	340	72	16.4
3425 C-1(6)(1)-Other expenditure Other schemes	1989-90	892	461.52	293	32.9
C-2(4)(5) Super-conductivity Programme C-2(4)5(3) Other expenditure		679.99	415.83	270	39.7
C-2(4)(6) Medium Range Forecasting Centre	1989-90	577	239.77	340	58.9
5425-BB Capital Outlay on other Scientific and Environmental Research					
BB(1)(1) Building Air-conditioning	1989-90	50	nil	44	88
BB(1)(2) Michinery and equipment	1989-90	120	100	20	16
BB2(2)(1) Buildings	1989-90	35	nil	35	100
BB2(2)(2)(2) Equipment	1989-90	65	nil	65	100

5455-Capital Outlay on Meteorology					
CC2(1) Equipment	1989-90	1115.50	940.28	217	24.2
2711 Flood Control and Drainage	1990-91	200	86.74	(-)114.52	57.25
3425					
C-1(6)-Other expenditure					
C-1(6)(1) Other schemes	1990-91	820	468.72	206.39	25.2
C-2(2)(3)(2) Other expenditure for super-conductivity research	1990-91	580	196.47	370.00	63.8
C-2(2)(1)(19) Technology Information Forecasting and Assessment Council	1990-91	288	207.32	70.00	25
C-2(4)(1)(3) Other expenditure	1990-91	600	331.42	280	46.6
4711					
Flood Control	1990-91	150	NIL	150	100
5425					
BB2(2)(2) Equipment	1990-91	65	15.46	47.50	79
5455					
CC1(1)Equipment	1990-91	1118.15	646.84	477.47	42.6
CC3(1) Equipment	1990-91	190.20	96.57	98.70	52
5425					
BB2(2)(1) Buildings	1991-92	20	nil	20	100
BB2(2)(2) Equipment	1991-92	71	4.26	51	71.8
BB2(3)(1) Land and Building construction modification & air-condtitioning	1991-92	580	26.80	408.16	70.3
5455					
CC2(1) Equipment	1991-92	383	404.60	54.73	14.3
3425					
B2(4)(1)(2) Travel Abroad	1992-93	75	19.52	(-)45	60
5425					
AA2(2)(1) Building	1992-93	40	nil	(-)40	100

AA2(3)(1) Land and Building construction modification & air-condtitioning	1992-93	600	56.33	239	39.8
AA2(3)(2) Equipment	1992-93	120	24.59	70	58.3
5455					
BB2(1) Equipment	1992-93	1417	656.77	712.75	50.24
BB3(1) Equipment	1992-93	310	385	49.50	16

* Based on latest year