Report of the Comptroller and Auditor General of India

for the year ended March 2002

Union Government

(Scientific Departments)

No.5 of 2003

CONTENTS

PREFACE

This Report for the year ended 31 March 2002 has been prepared for submission to the President under Article 151 (1) of the Constitution. It covers matters arising from test audit of the transactions of the Scientific Departments of the Union Government, the autonomous bodies funded by these Departments and some major scientific organisations associated with other Departments.

This Report includes two reviews and 13 paragraphs. The topics of these reviews are:

(i) Technology Transfer in Council of Scientific and Industrial Research

(ii) Department of Biotechnology

The cases mentioned in this Report are among those, which came to notice in the course of audit during 2001-2002. For the sake of completeness, matters relating to earlier years which could not be covered in the previous Reports have also been included, wherever pertinent. Similarly, results of audit of transactions subsequent to March 2002 in few cases have also been mentioned wherever relevant.

OVERVIEW

The expenditure on Scientific Departments during 2001-2002 was Rs 12649 crore. This represented an increase of 18.94 *per cent* over the last two years. Of the total expenditure on Scientific Departments, Rs 4870.15 crore related to Department of Atomic Energy, followed by Department of Space, which accounted for an expenditure of Rs 1900.97 crore. With reference to the budget allotment, the Scientific Departments had an overall unspent balance of Rs 908.33 crore. The Departments of Atomic Energy, Space and Ministry of Non-Conventional Energy Sources spent Rs 437.56 crore, Rs 133.98 crore and Rs 112.63 crore less than the allocation respectively.

This Report contains two performance reviews and 13 paragraphs. An overview of audit findings contained in the report is given below:

REVIEWS

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Technology transfer in Council of Scientific and Industrial Research

The Council of Scientific and Industrial Research (CSIR), under the Department of Scientific and Industrial Research, was established as a society in 1942. Its range of activities covers a wide spectrum of industrial R&D ranging from aerospace to micro electronics to metallurgy. Out of the 984 technologies developed by 23 laboratories/institutes of CSIR, 607 technologies including 247 developed prior to 1996-97 had not been transferred. The laboratories were unable to furnish specific information on the actual expenditure on the development of the technologies. 77 technologies were not found fit for commercialization. In 87 cases, the technologies required further improvements/developments. Of these, 65 cases were more than three years old. In the remaining 82 cases, the negotiations for transfer were underway. CSIR sustained a loss of Rs 99.31 lakh due to its violation of the prescribed guidelines on technology transfer.

(Paragraph 2.1)

MINISTRY OF SCIENCE AND TECHNOLOGY

Department of Biotechnology

The Department of Biotechnology (DBT) was set up in February 1986 to give an impetus to the development of biotechnology in the country. The objectives of DBT include the development of products, processes and technologies whose large-scale applications would result in societal and economic benefits. A total of 250 projects out of 1375 taken up by DBT during 1996-2002, were

reviewed in audit. In 32 projects involving releases of Rs 6.10 crore, the envisaged objectives were not achieved or were only partially achieved. In 80 projects, involving releases of Rs 15.39 crore, lapses in project management were observed. In 18 projects involving an expenditure of Rs 3.51 crore, technologies were developed but could not be transferred to industry. The Mission Mode Project on Semi-Intensive Prawn Aquaculture could not be implemented at two of the seven sites, while at four of the remaining sites the project failed to achieve all its objectives. The Mission Mode projects 'Development of Vaccines for contraception- a multi-centric study' and 'Technology development and demonstration of Biofertilizer' could not achieve their ultimate objectives. 41 technologies were transferred to industries for commercialisation between 1986-2001. Of these, only two technologies were in commercial use at present. **(Paragraph 3.1)**

TRANSACTION AUDIT FINDINGS

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Avoidable loss of Rs 64.93 lakh

CSIR owns two multi-storeyed buildings in New Delhi since 1987 called Maharani Bagh Scientific Apartments. It obtained the sanctioned load from Delhi Vidyut Board (DVB) at single point supply and itself managed the distribution from the sub-station. Though DVB charged non-domestic rates for the energy consumed, CSIR recovered electricity charges only on the basis of the prevalent domestic tariff from the occupants of the apartments. This resulted in avoidable loss of Rs 64.93 lakh from May 1995 to March 2002. **(Paragraph 4.1)**

Irregularity in transfer and commercialisation of technology leading to non-receipt of technology fee

Poor management of a transfer of technology agreement by Indian Institute of Petroleum resulted in the Basic Engineering Package for a process technology being handed over to a private company without recovering the entire amount of license and design fees due from it. There is no prospect of recovery of the amounts due. **(Paragraph 4.3)**

DEPARTMENT OF SCIENCE AND TECHNOLOGY

Unfruitful investment on procurement of Liquid Nitrogen Plant

The Indian Association for the Cultivation of Science, Kolkata, a society under Department of Science and Technology, imported a Liquid Nitrogen Plant from a foreign firm in August 1998 at a cost of Rs 59.05 lakh, capable of

producing 15 litres of Liquid Nitrogen per hour. Though the plant functioned only intermittently after its installation in April 1999 with a capacity of 10 litres per hour, a certificate of satisfactory installation was given in June 1999. The Association procured a turbo expander for the plant in September 2000 at a cost of Rs 5.95 lakh. However, the plant ceased functioning in December 2000. Though the foreign supplier agreed in July 2001 to inspect and test the plant at their works, the Association did not accept the offer in view of the risks involved in sending back the entire plant. **(Paragraph 5.1)**

Improper planning leading to idling of funds

Survey of India, Central Circle (SOICC) Jabalpur took 83,908 square feet of land on lease in September 1988 for the construction of an office building. Before the construction of office building could commence, SOICC modified its surplus residential staff quarters to locate its offices which were operating from hired premises and initiated the process of their shifting in July 1995. It instructed CPWD, which was executing the construction of the office building, to stop the work only in May 1996, by which time an expenditure of Rs 115.60 lakh had already been incurred. Though the revised estimates, for a modified office building were forwarded to the competent authority in November 2001 approval had not been accorded as of December 2002, resulting in blockage of funds amounting to Rs 115.60 lakh.

(Paragraph 5.2)

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Unfruitful expenditure on prematurely closed projects

Southern Regional Station of the National Dairy Research Institute, Bangalore undertook two in-house projects in January 1996 and April 1996 at an estimated cost of Rs 54.35 lakh and Rs 60 lakh respectively. Both the projects were foreclosed without achieving their objectives. This resulted in unfruitful expenditure of Rs 55.97 lakh being incurred on these projects.

(Paragraph 6.1)

Failure of Revolving Fund Scheme

ICAR sanctioned a loan of Rs 30.53 lakh to the Sugarcane Breeding Institute (SBI), one of its constituent units, in September 1997 for a project, "Mass Production of Bio-fertilisers for Sugarcane." to be repaid in five annual instalments. However, before sanctioning the loan, it did not ensure that SBI had conducted a formal feasibility study and market survey. Since the Institute could not earn the projected revenue, the first instalment amounting to Rs 6.11 lakh was made only in July 2000 and further instalments were yet to be paid. The future of the project is still uncertain and it is unlikely that the Institute would be in a position to repay the balance amount of Rs 24.42 lakh to ICAR. **(Paragraph 6.2)**

DEPARTMENT OF ATOMIC ENERGY

Improper Planning leading to delay in commissioning of equipment

Department of Atomic Energy procured two Gas-Tight High Temperature and one multipurpose Rotary Tubular Converter in June 1999 and March 2001 respectively at a total cost of Rs 169.07 lakh. These converters could not be installed/commissioned even after two to three years of their receipt as the infrastructure needed for their commissioning was not ready.

(Paragraph 7.1)

DEPARTMENT OF SPACE

Acceptance of equipment not conforming to specifications

VSSC, Thiruvananthapuram in 1998 procured a Laser Trimming System of lower specifications of two watts and 532 nanometers in place of the stipulated specifications of 8 watts and 1064 nanometers from a foreign firm at a cost of Rs 82.35 lakh. The system was intended as a replacement for the Laser Trimmer already available at the Space Centre, which was almost two decades old. The system was installed and commissioned, with a limited scope, after a delay of three years. **(Paragraph 8.1)**

DEPARTMENT OF INFORMATION TECHNOLOGY

Unfruitful Expenditure

A Linear Accelerator (LINAC) system for cancer therapy developed at a cost of Rs 72.38 lakh remained uninstalled since 1994. The project was funded by the Department of Electronics. While the system remained idle, the Linac tube and magnetron outlived their lives and had to be replaced at a cost of Rs 30 lakh. An expenditure of Rs 13.56 lakh had also to be incurred on refurbishment of the system. The system was yet to be installed as of October 2002. **(Paragraph 9.1)**

GEOLOGICAL SURVEY OF INDIA

Avoidable payment due to lack of planning and delay

Geological Survey of India, (GSI), Chandigarh purchased a piece of land on lease in March 1992 at a cost of Rs 33.90 lakh for construction of a residential complex. However, the layout plan for the construction was not approved by GSI (Headquarters) due to fund constraints and the lease deed was finally cancelled in October 2000. The purchase of land, without ensuring availability of funds coupled with the delay in deciding to surrender the land, led to an avoidable payment of Rs 23.68 lakh on account of ground rent, extension fee and forfeiture of the premium. **(Paragraph 11.1)**

CHAPTER 1 : INTRODUCTION

In pursuance of the national objective of promoting scientific and technological progress and attaining self-reliance, the Government of India has been making consistent efforts to foster research and development (R&D) activities. The investment in research and development increased from Rs 20 crore in the First Five Year Plan to about Rs 25529 crore in the Ninth Five Year Plan.

2. Expenditure

The comparative position of expenditure of major scientific departments/ organisations, during 2001-2002 and in the preceding two years is given below:

(Rupees in crore)

Sl. No.	Ministry/Department/Organisation	1999-2000	2000-2001	2001-2002
1.	Atomic Energy	4356.00	4551.00	4870.15
2.	Space	1677.39	1905.40	1900.97
3.	Indian Council of Agricultural Research	1275.86	1219.68	1287.80
4.	Environment and Forests (including Zoological Survey of India and Botanical Survey of India)	663.03	715.29	1014.23
5.	Science and Technology including Survey of India and India Meteorological Department	621.83	731.40	771.33
6.	Department of Scientific and Industrial Research (including grants given to Council of Scientific and Industrial Research)	816.45	892.32	913.99
7.	Non-Conventional Energy Sources	316.12	345.96	503.37
8.	Geological Survey of India (Ministry of Mines)	235.84	251.88	243.06
9.	Information Technology	195.06	331.60	521.63
10.	Biotechnology	127.77	151.57	185.58
11.	Indian Council of Medical Research	128.53	168.53	188.63
12.	Ocean Development	105.49	103.31	150.47
13.	Centre for Development of Telematics (Department of Telecommunications)	116.12	125.26	98.23
	Total	**10635.49**	**11493.2**	**12649.44**

2.1 Excess expenditure and unspent provisions under various Grants/ Appropriations

A summary of Appropriation Accounts for 2001-2002 in respect of the scientific departments/major scientific organisations, mentioned in the paragraph above, is given below:

(Rupees in crore)

Sl. No.	Ministry/Departments/Organisation	Grant/ Appropriation (including supplementary)	Expenditure	Unspent provision	Percentage of Unspent provision
1.	Atomic Energy	5307.71	4870.15	437.56	8.24
2.	Space	2034.95	1900.97	133.98	6.58
3.	Indian Council of Agricultural Research	1343.76	1287.80	55.96	4.16
4.	Environment and Forests, including Zoological Survey of India and Botanical Survey of India	1022.28	1014.23	8.05	0.79
5.	Science and Technology including Survey of India and India Meteorological Department	840.22	771.33	68.89	8.20
6.	Scientific and Industrial Research (including grants given to Council of Scientific and Industrial Research)	963.62	913.99	49.63	5.15
7.	Non-Conventional Energy Sources	616.00	503.37	112.63	18.28
8.	Geological Survey of India (Ministry of Mines)	251.23	243.06	8.17	3.25
9.	Information Technology	526.21	521.63	4.58	0.87
10.	Biotechnology	186.35	185.58	0.77	0.41
11.	Indian Council of Medical Research	188.63	188.63	-	-
12.	Ocean Development	168.81	150.47	18.34	10.86
13.	Centre for Development of Telematics (Department of Telecommunications)	108.00	98.23	9.77	9.05
	Total	**13557.77**	**12649.44**	**908.33**	

3. Audit of accounts of autonomous bodies

Accounts of autonomous bodies which receive 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.

The Comptroller and Auditor General of India is the sole auditor of seven autonomous bodies under the Scientific Departments. Separate Audit Reports are prepared on their accounts under sections 19 (2) and 20 (1) of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971. The position of grants released to these autonomous bodies is indicated in ***Appendix I***.

In addition, the Comptroller and Auditor General of India may conduct supplementary/super-imposed audit of any of 53 other autonomous bodies, which are substantially funded by the Government of India and whose primary audit is conducted by Chartered Accountants. The position of grants released to these autonomous bodies is indicated in ***Appendix II***.

4. Outstanding utilisation certificates

Ministries and Departments are required to obtain certificates of utilisation of grants by the Ministries and Departments from the grantees i.e. statutory bodies, non-governmental institutions etc. indicating that the grants had been utilised for the purpose for which these were sanctioned and that, where the grants were conditional, the prescribed conditions had been fulfilled. As per information furnished by the Pay and Accounts Officer of the concerned Department, 5427 utilisation certificates for grants aggregating Rs 642.89 crore were outstanding as given in ***Appendix III***. The defaulting Ministries/ Departments included (i) Environment and Forests (Rs 552.05 crore), (ii) Ocean Development (Rs 63.95 crore) and (iii) Information Technology (Rs 16.78 crore).

Utilisation certificates in 3377 cases aggregating Rs 363.13 crore were outstanding for more than three years. These included 1985 cases aggregating Rs 135.79 crore, where Utilisation Certificates were outstanding for more than ten years. The Departments need to take expeditious action to obtain the certificates.

5. Follow up on Audit Reports

In its Ninth Report (Eleventh Lok Sabha) presented to the Parliament on 22 April 1997, PAC had recommended that Action Taken Notes (ATNs) on all paragraphs pertaining to the Audit Reports for the year ended 31 March 1996 onwards be submitted to them duly vetted by Audit within four months from the laying of the Reports in Parliament. A review of outstanding ATNs on paragraphs included in the Reports of the Comptroller and Auditor General of

India, Union Government (Scientific Departments) as of December 2002 revealed the following position :

Sl. No.	Report No. and Year	Paragraph No.	Pertains to	Brief subject
1.	5 of 1999	9.1	Geological Survey of India	Residential quarters lying idle.
2.	5 of 2002	2.2	Indian Council of Agricultural Research	National Dairy Research Institute, Karnal
3.	5 of 2002	4.2	Council of Scientific and Industrial Research	Wasteful Expenditure on import of equipment
4.	5 of 2002	4.5	Council of Scientific and Industrial Research	Unproductive Expenditure
5.	5 of 2002	12.1	Department of Scientific and Industrial Research	Wasteful Expenditure

CHAPTER 2: COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

2.1 Technology transfer in Council of Scientific and Industrial Research

The Council of Scientific and Industrial Research (CSIR) under the Department of Scientific and Industrial Research was established as a Society under Societies Registration Act XXI of 1860 in 1942. One of the objectives of CSIR is to undertake R&D directed towards continuous improvement of indigenous technology and adaptation and development of imported technology. Of the 984 technologies developed by 23 laboratories/institutes, 607 were not transferred. 23 laboratories were unable to furnish specific information on the actual expenditure on the development of technologies. Reasons for non-transfer of 246 developed technologies showed that 77 technologies were not found fit for transfer, while 87 required further improvements/developments. Besides, in 82 cases including 34 developed prior to 1999-2000, the negotiations for transfer were under way. CSIR sustained loss of Rs 99.31 lakh due to violation of its guidelines on technology transfer.

Highlights

- **607 technologies, including 247 developed before 1996-97, were yet to be transferred.**

- **In 77 cases, the technologies developed were not found fit for transfer.**

- **23 laboratories were unable to furnish specific information on the actual expenditure incurred on the development of all the technologies.**

- **CSIR sustained a loss of Rs 99.31 lakh on technology transfer due to violation of its guidelines on technology transfer.**

- **Royalty/premia of Rs 134.58 lakh remained unrealised in 17 cases of technology transfer.**

2.1.1 Introduction

The Council of Scientific and Industrial Research (CSIR) under the Department of Scientific and Industrial Research (DSIR) was established as a society in 1942. The research and development (R&D) activities of CSIR are carried out by a chain of 40 laboratories through in-house as well as contract research.

A significant and measurable output of research is the development of intellectual property. This, *inter-alia,* includes patents, copyrights, registered designs, trademarks, know-how for process/product design and computer software. The intellectual property generated is licensed to end-users through specific contractual arrangements (technology transfer agreements). All protectable intellectual property is required to be protected through appropriate legal instruments i.e. patents, copyrights, registered design trademark etc.

The guidelines issued by CSIR in August 1989 for technology transfer do not provide any rigid formula for determining the price of intellectual property. However, while pricing intellectual property, the guidelines provide for consideration of (a) the cost of development, (b) the net benefits to be derived by the licensee, (c) size and number of clients, (d) cost of imported intellectual property, (e) piracy of intellectual property and (f) opportunity value. The guidelines also advocate charging of adequate amount as fee for the licence granted for commercial exploitation of intellectual property. This could be a lump-sum and / or recurring royalty. The laboratories are responsible for prompt collection of money accruing through direct licensing and through technology transfer agencies. They are required to evolve a proper mechanism for collecting and monitoring the accrual and realization of such monies.

2.1.2 Scope of Audit

The present review, covering the period 1996-2002, focuses on transfer of technologies. The study was conducted in 23 CSIR laboratories. ***(Annexure I)***.

2.1.3 Functional arrangement

The R&D Planning and Business Development Division (RPBDD), and the Intellectual Property Management Division (IPMD) at CSIR headquarters are responsible for promoting and facilitating marketing of CSIR's knowledge base and services and protection of intellectual property.

2.1.4 Management of technology development and transfer

23 laboratories studied had developed 984 technologies. Out of these 607 technologies, including 247 developed before 1996-97, could not be transferred for various reasons. These include economic non-viability of the technologies, market competition, cheaper imported technologies as also mortality at bench/demonstration/pilot plant scale. CSIR sustained a loss of Rs 99.31 lakh while transferring technologies in violation of CSIR guidelines. Royalty/premia of Rs 134.58 lakh remained unrealised in 17 cases of technology transfer.

In the 23 laboratories/ institutes under review, 984 technologies were ready for transfer over the period 1996-2002. Of these 185 cases (representing 19 *per cent*) were examined in detail in audit besides a general scrutiny of the remaining cases. The findings are given below:

2.1.4.1 Technologies developed but not transferred

Out of 984 technologies ready for transfer during 1996-2002, 607 including 247 developed prior to 1996-97 could not be transferred

In the laboratories under review, 607 technologies developed could not be transferred till March 2002 ***(Annexure II)***. 247 of these technologies were developed prior to 1996-97. Out of the 607 technologies not transferred, the laboratories could identify reasons for non-transfer in only 246 cases i.e., 41 *per cent* of cases ***(Annexure III)***. Four laboratories, viz., Central Road Research Institute, National Botanical Research Institute, National Environmental Engineering Research Institute and National Physical Laboratory failed to identify any reasons for non-transfer of technology. Another 13 laboratories did not provide reasons for non-transfer of technologies in respect of all cases, apparently due to the fact that they were not able to analyse the reasons for such non-transfer. The reasons for non-transfer of technologies developed are discussed in the succeeding paragraphs. It is also relevant to mention here that the 23 laboratories reviewed were unable to furnish specific information on the actual expenditure incurred on the development of all the technologies. It would be appropriate if details of expenditure are systematically maintained in respect of all technologies developed, including those developed from in-house projects.

(I) Technologies not found suitable for transfer

A scrutiny of the 246 cases of non-transfer of technology revealed that 77 technologies were not found fit for transfer on account of the following reasons:

◘ Technologies not attracting the interest of industry

In 40 cases pertaining to 11 laboratories, the technologies were not able to attract entrepreneurs and as a result were not commercialised. This was mainly due to a failure to realistically assess the market potential. Some illustrative cases are discussed below:

Two technologies developed by CBRI costing Rs 19.70 lakh could not be transferred even after reducing the lumpsum fee

(a) In March 1998, Central Building Research Institute (CBRI) developed two technologies, viz., (1) Polycem tiles; and (2) Polytiles in an in-house project entitled "Development of tiles for buildings" at a cost of Rs 19.70 lakh. CBRI offered the technologies to two companies at a lumpsum fee of Rs 2.50 lakh together with recurring royalty in November 1997 and July 1999. Later in March 2001, CBRI reduced the licence fee to Rs 1.00 lakh. Despite this, the technologies could not be transferred. Apparently, the technologies developed did not attract industrial interest.

Two technologies costing Rs 32.30 lakh could not be transferred for want of buyer

(b) Central Building Research Institute (CBRI) developed two technologies viz., (i) an improved process for manufacture of natural fibre based composite laminates useful for making plain/corrugated sheets; and (ii) a novel molding composition, in an in-house project entitled "Moisture resistant unsaturated polyester resin as matrix material for building composites" in March 1998 at a cost of Rs 32.30 lakh. Since the development of the technologies, CBRI was searching for customers who could commercialise these processes. However, CBRI could not identify any entrepreneur as of March 2002. It is clear that the project was launched without ascertaining the market needs and identification/involvement of end users.

Technology costing Rs 51.69 lakh was not transferred as no entrepreneur showed interest

(c) Central Glass and Ceramic Research Institute (CGCRI) undertook an in-house project called "Transformation toughened engineering ceramics" in 1986 without cost estimates, to develop and characterise the capability for production of transformation toughened Alumina and Zirconia ceramics for engineering applications. The technology was to be transferred after standardizing the process. The project was completed in 1996 at a cost of Rs 51.69 lakh. On completion, CGCRI approached a few manufacturing industries in the same field for transfer of the technology. Even after a lapse of six years, none showed any interest in the technology. Thus, the entire expenditure of Rs 51.69 lakh on developing the technology became infructuous since the project was undertaken without a proper market assessment.

(d) National Aeronautical Laboratory (NAL) developed rough diamond coating directly on polishing wheels by an ingenious vapour deposition route

for obtaining second generation polishing wheels in March 1998. The project involved an expenditure of Rs 145.92 lakh. NAL had claimed that if the project was completed successfully there would be no necessity for India to import diamonds for metal diamond composites. However, the technology was not transferred even four years after its development. NAL stated in June 2002 that M/s Wendt India had initially evinced interest but subsequently did not want to commercialise the technology as their focus had changed. NAL also stated that commercialisation of results needed customisation to suit industry and that such customisation had to be carried out with the association of an industrial partner. NAL further stated that the customisation would be taken up in the second phase after identifying a suitable industrial partner. Thus, a technology which had considerable potential in the Indian diamond industry remained non-commercialised for four years.

Technology costing Rs 145.92 lakh developed by NAL could not be transferred even after four years of development

(e) National Environmental Engineering Research Institute (NEERI), took up an in-house project entitled "Development of vehicular emission control technology" in July 1996 at a cost of Rs 19.75 lakh to be completed in three years (1999). The objectives of the project were to develop a three-way catalytic converter and zero emission -2 wheeler vehicle. The scope of the project was widened in October 1999 and a new objective "dissemination of catalytic converter technology and its further improvement to meet the Euro-II emission norms" was included. NEERI completed the project in June 2001 at a cost of Rs 135.48 lakh. The technology has not been transferred to industry. Earlier, in May 1999, NEERI had proposed to transfer the technology at a lumpsum amount of Rs 15 lakh and royalty @ 3 *per cent*. NEERI stated (June 2002) that the transfer could not be effected due to competition by well-established converter manufacturers and their existing tie-ups with automobile manufacturers and also because there was no legislation for the retro-fitment of catalytic converters on used/on-road vehicles. The catalytic converter market was also restricted to automobile manufacturers and the growth of the converter market in India was not substantial for passenger cars. It would appear that NEERI had not carried out a market survey before taking up the project. The expenditure on the project amounting to Rs 135.48 lakh did not achieve the desired results.

Technology costing Rs 135.48 lakh developed by NEERI could not be transferred as it was developed without taking up market survey

(f) In March 1997, Regional Research Laboratory (RRL), Jorhat, developed a cement production process using VSK (Vertical Shaft Kiln) at an estimated cost of Rs 34.31 lakh without assessing the demand in the market. The laboratory took up another project in April 1997 at an estimated cost of Rs 103.12 lakh to upgrade the existing VSK technology for cement manufacture for energy efficiency and pollution abatement. The project was completed in March 2002 incurring an expenditure of Rs 127.83 lakh. The

Technology developed by RRL(J) without assessing the demand could not be transferred for want of buyers

technology has not yet found buyers (June 2002). The laboratory stated in September 2001 that the project was taken up anticipating a demand for the technology during the period. However, no demand was received since no new cement plants had been set up. The expenditure incurred on developing and upgrading the VSK technology has remained infructuous.

◘ Technologies not found satisfactory by buyers

In seven cases, pertaining to three laboratories, the technologies were not found satisfactory by the buyers primarily due to the failure to meet guaranteed level of performance. One such case is discussed below:

Technology developed by NAL was found unstable and not perfected as per specifications of the buyer firm

National Aeronautical Laboratory (NAL) entered into an agreement with M/s Lakshmi Machine Works Ltd. in November 1994 for development and transfer of Straight Foil Bearings. The client paid an advance of Rs 10 lakh to NAL towards the cost of 1000 bearings. The client was subsequently to pay Rs 15 lakh for development of foil bearings, Rs 30 lakh on their successful development as a lumpsum fee and a recurring royalty of 10 percent on its ex-factory sale price. If the party was not satisfied with the performance of the bearings, NAL would be free to negotiate with other industries. The bearings were supplied by NAL in 1995. The client found that the bearings were unstable and not perfected as per the required specifications. NAL, however, did not undertake further efforts to supply bearings to the satisfaction of the client. It also did not negotiate with other industries to explore possibilities of supplying bearings to them. As a result, the anticipated external cash flow from the commercialisation of the technology did not arise. NAL stated in June 2002 that while the technology performed satisfactorily in a laboratory environment, it did not work successfully in an industrial environment. Thus, the commercialisation of straight foil bearings could not be carried out.

◘ Technologies found economically not viable

In 24 cases pertaining to eight laboratories, the technologies were found not suitable for commercial exploitation either due to availability of cheap imports or because the technologies developed were not economically viable. An illustrative case is discussed below:

Indian Institute of Chemical Technology (IICT) entered into a Memorandum of Understanding (MOU) with Technology Information Forecasting and Assessment Council (TIFAC) in March 1998 for the development of lab scale know-how in respect of Acephate to the pilot plant scale leading towards commercial exploitation. The cost of the project was estimated at Rs 50 lakh with IICT and TIFAC contributing equal shares. IICT had to pay back the

funding from TIFAC (amounting to Rs 25 lakh) on the successful development of the technology. The project was to be completed within one year from the date of signing of the MOU. A Monitoring Committee, established for the project, accepted the work as completed in August 1999. However, the technology could not be commercialised, as cheaper alternatives with lower specifications were available in the market. IICT was to pursue the matter for transferring the technology as also to explore the export market. Till August 2002, IICT could not commercialise the technology. In addition IICT is yet to repay Rs 25 lakh to TIFAC.

The technology developed by IICT in 1999 could not be commercialised as cheaper alternatives with lower specification were available

◘ Failure to identify alternate buyers

In six cases pertaining to three laboratories, the technologies could not be transferred due to failure of the laboratories/CSIR to make an effective attempt to transfer the technologies developed for commercialisation by identifying other interested firms. Two illustrative cases are discussed below:

CLRI failed to re-license a vaccine delivery system even after the initial buyer turned sick resulting in non-commercialisation of the product

(a) In November 1994, Central Leather Research Institute (CLRI) entered into an agreement with M/s NATCO Pharma Ltd for development/evaluation of biodegradable polymeric micro spheres for oral delivery of vaccine systems. The firm was to pay Rs 13.50 lakh to CLRI in four instalments for the said process including Rs 1.50 lakhs due on completion of clinical trials and demonstration of the process. CLRI developed the vaccine delivery system and submitted its final report in October 2000 without carrying out clinical trials and demonstration of knowhow as provided in the agreement. It received only Rs 9.25 lakh from the client against Rs 12.00 lakh due from it. CLRI stated that the company turned sick and therefore the clinical evaluation could not be conducted. CLRI also contended that the vaccine delivery system had been successfully developed and that it showed very positive results. However, CLRI did not take any steps for licensing the product to other interested parties. Thus, the vaccine delivery system could not finally be commercialised.

(b) In February 1995, National Aeronautical Laboratory (NAL) took up a project for development of technology for the manufacture of thermoset prepegs in collaboration/partnership with Aeronautical Development Authority (ADA) and TIFAC. This technology was of significance from the strategic point of view, as prepegs required for aircraft and defence applications were being imported. Phase I of the technology development was jointly funded by TIFAC and ADA at a total cost of Rs 84.86 lakh. On successful completion of Phase I, Phase II for transfer of technology to Indian Petrochemicals Ltd (IPCL) was taken up at a total cost of Rs 25 lakh, which was again financed by TIFAC and ADA. NAL successfully demonstrated the

process of manufacturing prepegs to IPCL in December 1998. IPCL, however, could not produce the prepegs due to non-availability of initial grades such as carbon fibres and hence qualification and type approval could not be taken up. NAL stated in June 2002 that the requirement of prepegs was very small and was met by imports. If this was indeed the case, it would appear that the anticipated demand of 400 to 500 prepegs per annum while formulating the project was misplaced. NAL also stated that initially IPCL had been selected since they already had some background in the manufacture of carbon fibres but subsequently IPCL took a policy decision to stop such manufacture. However, NAL did not explore the possibility of identifying other units/industries for the last four years so that the technology developed at a total cost of Rs 109.86 lakh could be commercialised.

Though NAL successfully demonstrated the technology, it could not be commercialised due to non-availability of raw materials. No further initiative was taken by the institute

(II) Technologies requiring further developments/ improvements before transfer

In 87 cases pertaining to eight laboratories, the technologies could not be transferred as further work was necessary before the transfer. Out of these 87 cases, the cost of 62 technologies was Rs 892.56 lakh. Information regarding the remaining cases was not furnished. In 28 cases, only lab-scale/ bench scale technologies were available which required further development. In 51 cases, commercial evaluation/ field trials/ standardization/ optimisation/ validation was required, while in eight cases, up-gradation of process was required. Of these, 65 cases were more than three years old.

(III) Process of transfer underway

In 82 cases pertaining to 12 laboratories, the process of transfer was stated to be underway. The information furnished in respect of 49 cases indicated that the cost of these technologies was Rs 502.36 lakh. In 54 cases, the laboratories were exploring the market, while in 28 cases, negotiations were under way. Of these, in 34 cases the process of transfer had been continuing for more than three years without any concrete outcome.

2.1.4.2 Technologies transferred violating CSIR guidelines

2.1.4.2.1 (I) Under costing in transfer of technologies

(a) In September 1996, Centre for Biochemical Technology (CBT) developed from an in-house project entitled 'Chemical Synthesis of a gene encoding human epidermal growth factor and its expression in E.coli' at a cost of Rs 28.44 lakh, a clone of recombinant plasmid for making human epidermal growth factor in E.Coli (HEGF). This technology along with other technologies for staphylokinase and Lysostaphin (cost of development not

known) was transferred to M/s Bharat Biotech in March 2000 at a lumpsum fee of Rs 11.00 lakh and royalty @ 6 *per cent* for seven years from the date of approval by the Drug Controller of India (DCI). According to the guidelines of CSIR, the transfer cost was to be derived from the inputs that went into production. A study of the project costing showed that the cost of manpower was taken at Rs 3.00 lakh while the actual cost incurred was Rs 16.44 lakh which led to under-costing of the technology by Rs 13.44 lakh. As a result the technology fetched a low lump-sum fee for its transfer. The technology, not available anywhere else in the country, was sold to the firm without considering the actual inputs that had gone into its development in violation of the guidelines of CSIR.

CBT transferred three technologies at a lumpsum fee of Rs 11.00 lakh without including the actual cost of man power; thus undercosting the technology by Rs 13.44 lakh

(b) Regional Research Laboratory (RRL), Jorhat, developed a process for manufacture of crayons in an in-house project incurring Rs 53.14 lakh. The process was transferred to a firm for commercial production in September 2000 at a lumpsum fee of Rs 2,000/- without approval of the competent authority. RRL stated (May 2002) that the technology cost was kept at Rs 2000/- because the product was to be manufactured on a tiny scale. However, it may be mentioned that the technology transfer fee did not match the large expenditure incurred on the project and to that extent violated the guidelines on technology transfer.

RRL(J) transferred a technology for Rs 2000 developed from an in-house project costing Rs 53.14 lakh

(c) Indian Institute of Chemical Biology (IICB) developed a technology entitled "Herbal therapeutic preparation" in August 2000. The technology was licensed in September 2000. A Memorandum of Understanding (MOU) was signed with M/s Herbochem Remedies India (P) Limited in September 2000 for a period of 25 years, renewable after every two years on an exclusive basis at Rs 10 lakh. This was in violation of the terms and conditions of the CSIR guidelines which provide that the sponsor be given a non-exclusive license for a limited period of time, normally not exceeding five years for commercial exploitation of intellectual property. Upto June 2002, IICB had received a royalty of Rs 15.55 lakh without verification of the sales record of the firm. IICB stated in May 2002 that it had no experience in product transfer and that the MOU had been hurriedly finalised.

IICB licensed a technology in September 2000 for a period of 25 years in violation of CSIR guidelines

(II) Non-realisation of outstanding royalty/premia

CSIR guidelines provide for charging an adequate amount as fee. This could be a lump-sum and/or recurring royalty. For this purpose, the laboratory/ institute was to evolve a proper mechanism for monitoring the accrual and realisation of such monies. An amount of Rs 134.58 lakh was due as of March 2002 in Centre for Biochemical Technology, Central Institute of Medicinal and Aromatic Plants, Central Salt and Marine Chemicals Research Institute,

Six laboratories failed to realize the outstanding royalty/premia of Rs.134.58 lakh due to non-adherence to CSIR guidelines

Indian Institute of Chemical Technology, Industrial Toxicology Research Centre and National Chemical Laboratory on account of premia/royalty in 17 cases of commercialisation of technology due to non-adherence to guidelines ***(Annexure IV)***. The laboratories did not furnish details of the periods for which royalty/premia were outstanding in all cases. Information in respect of other laboratories was not made available. Three specific cases are discussed below :

CBT licensed a technology to a firm who complained that the technology was already published and in use. Firm refused to pay the agreed amount

(a) Centre for Biochemical Technology (CBT) entered into an agreement with M/s. Argosy Overseas (P) Ltd. in August 1995 for licensing of know-how for transfer of technology for 1-H tetrazole and DMTrcl at a lumpsum fee of Rs 3 lakh and royalty @ 5 *per cent* of ex-factory sales of the product for a period of 5 years. The process was demonstrated to the firm to its satisfaction. The firm paid royalty of Rs 0.56 lakh for the period upto May 1997. For subsequent years, the firm did not pay the royalty as per the agreement. At the same time, M/s. Argosy Overseas (P) Ltd. sought assistance from CSIR for preparation of feasibility report, basic engineering package and assistance in design of a pilot plant capable of making 1-H Tetrazole from DCDA and sodium azide in collaboration with National Chemical Laboratory. CBT took up the assignment and the agreement was signed in January 1997 with the firm for a consideration of Rs 10 lakh. The project was to be completed in 10 months. The basic engineering package was successfully developed and handed over to the firm in March 1998 without recovering the proportionate cost as per the agreement. However, the firm in January 2000 complained to CSIR stating that they were being supplied with technology already published which was also being used by another firm in Hyderabad. Citing this as the reason, the firm refused to pay the agreed amount of Rs 10.00 lakh for the assignment and also stopped payment of royalty. The matter was under arbitration (March 2002).

IICT failed to recover Rs 13 lakh due by October 1997

(b) M/s Everest Organics Ltd., Hyderabad obtained process knowhow for the drug Parahydroxy Phenyl Glysine in October 1994 from Indian Institute of Chemical Technology (IICT), the cost of which was to be recovered in seven instalments. The firm failed to pay the last three instalments which were due by October 1997 amounting to Rs 13 lakh. IICT was yet to take any action for recovering the amount even after a lapse of 5 years (March 2002). IICT was also aware that the product had since been commercialised.

(c) In another case, IICT demonstrated process for improvement in an anti-malarial drug to the sponsor's (M/s Hicel Pharma Limited) satisfaction in June 1999. However, the sponsor neither paid the license fee of Rs 1 lakh nor any royalty on the ground that the demonstration was incomplete as there was

an explosion in their factory while trying out the process given by IICT. The Institute did not furnish any reply to audit on the issue.

(III) Non-adherence to TOT agreement resulting in undue benefit to buyer

IICT released bank guarantee and deferred the payment of Rs 18.75 lakh and changed the terms of the agreement without the approval of competent authority

In December 1996, Indian Institute of Chemical Technology (IICT) entered into an agreement with M/s Savans Chemicals India Limited, Mumbai to develop process know-how of undecenoic acid (UDA) and Heptaldehyde. The detailed engineering package for the commercial plant was also to be provided at a cost of Rs 75 lakh to be recovered in five instalments from the firm. IICT successfully completed the development of the process know-how in March 2000. The final payment of Rs 18.75 lakh was due in December 1999 for which IICT had a bank guarantee from the firm. However, the firm failed to pay the last instalment. IICT also failed to encash the bank guarantee. On a subsequent request from the firm, IICT released the bank guarantee and agreed to convert the last instalment into recurring royalty @ two *per cent* on sale of UDA/Heptaldehyde. On release of the bank guarantee, IICT also changed the terms and conditions of agreement in January 2002 without the approval of competent authority. IICT stated in June 2002 that the Technology Development Board (TDB) had recommended the action cited above on account of the company's financial problems and hence final instalment of Rs 18.75 lakh was deferred.

2.1.4.2.2 Undue benefit to buyer

ITRC lowered the agreed cost of a technology thus giving undue benefit of Rs 14.00 lakh to a buyer

Industrial Toxicology Research Centre (ITRC) developed a device from an in-house project entitled "Development of electrochemical sensors" for the quantification of arsenic in water and process thereof at a cost of Rs 41.44 lakh. The know-how of the technology was to be transferred to M/s. ELICO, in May 2001 at a cost of Rs 15 lakh (Rs. 10.00 lakh at the time of transfer of technology and the remaining Rs 5 lakh in the following year with some type of guarantee. Subsequently, the technology was transferred to M/s ELICO in August 2001 at a lumpsum premium of Rs 1.00 lakh and royalty @ 10% of the ex-factory sale price. The cost of transfer of technology was reduced to Rs 1.00 lakh without assigning any reasons, causing a loss of Rs 14 lakh to the Institute. The basis for reduction of charges from Rs 15 lakh to Rs 1 lakh was not intimated to Audit.

2.1.4.2.3 Incorrect claim of transfer of technology

The Indian Institute of Chemical Technology (IICT) wrongly included four cases under the category of technologies transferred by it. In two of these cases, (a) a collaborative project "Management of yellow stem borer by

pheromone mediated mating disruption and mass trapping" and (b) a grant-in-aid project "Biodegradable plastics: reinventing the cellulose plastics", it was found that the projects were not completed. In the first case, the completion report had not been received and in the second case the Principal Investigator resigned, leaving the project incomplete.

Two other consultancy projects (c) "Development of a suitable analytical method for detecting the base alcohol of Indian made foreign liquors to know whether it is ENA based or not" and (d) "Demonstration of coal gasification and supply of coal gas for process heat to tunnel kilns in pottery industry", were wrongly included in the category of technology transfer. They involved only analysis, evaluation and demonstration and there was no transfer of technology.

The review was referred to the Council in October 2002 and again in January 2003. No reply has been received so far.

ANNEXURE-I

LIST OF LABORATORIES/INSTITUTES

1. Central Building Research Institute, Roorkee (CBRI)
2. Centre for Biochemical Technology, Delhi (CBT)
3. Centre for Cellular and Molecular Biology, Hyderabad (CCMB)
4. Central Food Technological Research Institute, Mysore (CFTRI)
5. Central Glass and Ceramic Research Institute, Kolkatta (CGCRI)
6. Central Institute of Medicinal and Aromatic Plants, Lucknow (CIMAP)
7. Central Leather Research Institute, Chennai (CLRI)
8. Central Road Research Institute, Delhi (CRRI)
9. Central Salt and Marine Chemicals Research Institute, Bhavnagar (CSMCRI)
10. Indian Institute of Chemical Biology, Kolkatta (IICB)
11. Indian Institute of Chemical Technology, Hyderabad (IICT)
12. Industrial Toxicology Research Centre, Lucknow (ITRC)
13. National Aerospace Laboratory, Bangalore (NAL)
14. National Botanical Research Institute, Lucknow (NBRI)
15. National Chemical Laboratory, Pune (NCL)
16. National Environmental Engineering Research Institute, Nagpur (NEERI)
17. National Geophysical Research Institute, Hyderabad (NGRI)
18. National Metallurgical Laboratory, Jamshedpur (NML)
19. National Physical Laboratory, New Delhi (NPL)
20. Regional Research Laboratory, Bhopal (RRL-Bho)
21. Regional Research Laboratory, Bhubaneswar (RRL-Bhu)
22. Regional Research Laboratory, Jorhat (RRL-J)
23. Regional Research Laboratory, Thiruvananthapuram (RRL-T)

ANNEXURE-II

DETAILS OF TECHNOLOGIES DEVELOPED AND TRANSFERRED

Sr. No.	Name of Laboratory/ Institute	Technologies		
		developed	transferred	lying un-transferred
1.	CBRI	92	81	11
2.	CBT	23	10	13
3.	CCMB	05	02	03
4.	CFTRI	133	27	106
5.	CGCRI	31	11	20
6.	CIMAP	27	17	10
7.	CLRI	65	04	61
8.	CRRI	49	25	24
9.	CSMCRI	28	09	19
10.	IICB	33	02	31
11.	IICT	150	130	20
12.	ITRC	08	04	04
13.	NAL	05	-	05
14.	NBRI	50	03	47
15.	NCL	NA	NA	NA
16.	NEERI	37	-	37
17.	NGRI	04	01	03
18.	NML	35	20	15
19.	NPL	49	11	38
20.	RRL-Bho.	15	07	08
21.	RRL Bhu.	112	-	112
22.	RRL-J	14	05	09
23.	RRL-T	19	08	11
Total		**984**	**377**	**607**

ANNEXURE-III

I. Technologies not found suitable for transfer

Sr. No	Name of lab/ Inst.	Name of technology	Year of Development	Cost of development *(Rs in lakh)*
Technologies not attracting the interest of industry				
1.	CBRI	Polycem tiles and Polytiles	1997-98	19.70
2.	CBRI	Manufacture of natural fibre based composite laminates useful for making plain/corrugated sheets and a novel molding composition	-do-	32.30
3.	CGCRI	Process for production of transformation toughened alumina and zirconia ceramics	1995-96	51.69 (Only salary)
4.	CSMCRI	Process for manufacture of electro dialysis plant	1998-99	75.07
5.	CSMCRI	Epsom salt	1987-88	NA
6.	CSMCRI	Light basic magnesium carbonate	1962	NA
7.	CSMCRI	Heavy basic magnesium carbonate	1962	NA
8.	CSMCRI	Aluminum Silicate	1988	NA
9.	CSMCRI	Thermal insulation moulds from wollasto nite mineral	1989	NA
10.	CSMCRI	Jojoba body cream	1988-89	NA
11.	CSMCRI	Jojoba skin care lotion	1989-90	NA
12.	CSMCRI	Potassium schnoenite from mixed salt	1964-66	NA
13.	IICB	Rapid diagnosis of visceral leishmaniasis/ kala-azar	1995-97	20.00
14.	IICB	ELISA kit for steroid hormones: testosterone cortisol and dehydroepian drosterone	1990	NA
15.	IICB	A process for preparation of technetiun-99m diethylen triamine penta acetic acid diester	1990-91	NA
16.	IICB	A device for measurement of human limb movement in 3-D space with special reference to Parkinson's disease	1995	NA
17.	IICT	Diethyl malonate (CO route)	1996-97	1.00
18.	IICT	Tattoo Ink	1999-00	0.25
19.	IICT	Tristearin from castor oil	-	NA
20.	IICT	B-phenyl ethyl amine	-	-
21.	IICT	Oleic acid	1984-85	-
22.	IICT	L-Aspartic acid	1994-95	-
23.	IICT	Gas sensors-hydrogen sulphide	1995-96	-
24.	IICT	Gas sensors to detect CO.	1995-96	-

Sr. No	Name of lab/ Inst.	Name of technology	Year of Development	Cost of development *(Rs in lakh)*
25.	IICT	Ethyl chloro actate from chloro acetic acid	1995-96	-
26.	IICT	Oryzanol from rice bran oil	1995-96	-
27.	ITRC	Bact-O-kill	1991	1.50
28.	-do-	An electronic device for disinfection of drinking water	1990	5.00
29.	NAL	Rough Diamond coating	1997-98	145.92
30.	NAL	Isothalamide fibre	1997-98	29.50
31.	NEERI	Catalytic converter technology	2001-02	135.48
32.	RRL-Bho	Sisal cement roofing sheet	1992-93	7.63
33.	RRL-Bho	Ceramic fibre preforms for composites materials	1995-96	0.55
34.	RRL-Bho	Red mud cementitious Binder	1992-93	8.00
35.	NGRI	Transient Electromagnetic System (GS-100)	1984	N.A.
36.	NGRI	Resistivity Equipment for deep electrical investigations	2000	N.A
37.	RRL (J)	Black board with synthetic surface	1995-96	-do-
38.	RRL (J)	Chlorinated paraffin wax	-do-	-do-
39.	RRL (J)	Agro technology on annatto (Bixa arellana)	-do-	-do-
40.	RRL (J)	Cement production process – using VSK	1996-97	127.83
Technologies not found satisfactory by buyers				
41.	RRL-T	Light weight bricks from clay and coconut pith mix	1984	0.75
42.	RRL-T	Pre-polymer resin from CNSL by phosphorilation technique (Anorin 38)	1988	0.75
43.	RRL-T	Manufacture of piperin with white pepper	1992	0.75
44.	CBT	Know how for triglyceride kits on enzyme methods	1994-95	
45.	CBT	Technology for preparation of reagents in the kit form to the diagnostics of tuberculosis using ELISA	N.A.	N.A.
46.	CBT	Know-how for manufacturing diagnostic strips for semi quantitative estimation of glucose in urine.	1993-94	
47.	NAL	Straight foil bearings	1995	10.00
Technologies found economically not viable				
48.	CGCRI	PTC thermistor for mosquito repellant application	1993-94	1.00
49.	IICT	Acephate (DMPAT route)	2000-01	50.00
50.	IICT	Cis-platin	1995-96	-
51.	IICT	Vitamin-A (roche process)	1996-97	-
52.	IICT	2,3,6,-Trimethyl phenol (intermediate for vitamin-E)	1996-97	-
53.	NAL	64 bit parallel super computer	Prior to 1996	99.30
54.	RRL-T	Treatment of effluent waste water from natural rubber processing unit	1989	1.50

Sr. No	Name of lab/ Inst.	Name of technology	Year of Development	Cost of development *(Rs in lakh)*
55.	CBT	Technologies for preparation of reagents in kit form to the diagnostics of ABPA	N.A.	N.A.
56.	CBT	Technology for preparation of universal support used in synthesis of oligo nucleotides	N.A.	N.A.
57.	CBT	Technology for preparation of value added products of industrial/research importance starting from hen egg.	N.A.	N.A.
58.	CBT	Technology for process of preparation of products of biochemical & industrial p-NPP BSA Lysozyme Glucosamine HCl	N.A.	N.A.
59.	RRL-Bhu	'Harsha' multi fuel portable stove	N.A.	N.A.
60.	RRL-Bhu	Sk-Series fixed chullas	N.A.	N.A.
61.	RRL-Bhu	Power operated Paddy thresher	N.A.	N.A.
62.	RRL-Bhu	Power operated multi purpose winnower	N.A.	N.A.
63.	RRL-Bhu	Power operated paddy thresher & winnower	N.A.	N.A.
64.	RRL-Bhu	'Queen' coal/wood fired pottery kilns	N.A.	N.A.
65.	RRL-Bhu	Sk-multipurpose oven (Stove-Bakery oven-space heater)	-do-	-do-
66.	RRL-Bhu	Multipurpose Drier	-do-	-do-
67.	RRL-Bhu	SK Multipurpose Bukhari (Cook stove-space heater)	-do-	-do-
68.	RRL-Bhu	Tera cotta water filter (without ceramic candle)	-do-	-do-
69.	RRL-Bhu	Glazing of terra cotta (waste glass coating)	-do-	-do-
70.	RRL-Bhu	Improved multi fuel and biomass chulhas	-do-	-do-
71.	RRL-Bhu	Low cost coal-fired furnace for melting brass and bell metals	-do-	-do-
Failure to identify alternative buyers				
72.	NAL	Manufacture of thermoset prepegs	1998-99	109.86
73.	CLRI	Bio-degradable polymeric microsphere for oral delivery of vaccine systems	2000-01	9.25
74.	CLRI	A process for the preparation of reconstituted collagen substratum	1999-2000	0.40
75.	CLRI	An improved process for the purification of water by removing phenol from water containing phenol using a mutated Pseudomonas strain.	N.A.	5.00
76.	CLRI	A two-dimensional stress relaxation testing device.	1998	4.75
77.	IICB	Technology for electrofusion apparatus	1998	10.00

Technologies for which year of development is not available, is taken as developed prior to 1996-97

II. Technologies requiring further developments/improvements

Sr. No	Name of lab/ Inst.	Name of technology	Year of Development	Cost of development *(Rs in lakh)*
Lab scale/Bench scale technologies				
1.	CGCRI	Hexagonal boron Nitride	N.A.	8.80
2.	CLRI	A process for the preparation of a tanning agent containing titanium and chromium for using in leather processing	1995-96	0.50
3.	CLRI	A process for the preparation of novel alkylcycloalkyl thiophene copolymers for light emitting diode applications.	1997	0.50
4.	CLRI	An improved process for dyeing leather using low intensity power ultrasound for application in leather industry.	1998	0.49
5.	CLRI	A novel process for the elimination of free formaldehyde present in leather.	1998	1.50
6.	CLRI	A process for the production of a novel lipase	1998-99	25.72
7.	CLRI	An improved process for the unhairing of hides/skins	1999	0.50
8.	CLRI	A process for the purification of inorganic nitrogen laden waste water and or water	2000	5.00
9.	CLRI	A novel process of aqueous finishing for water proof leathers	2000	0.25
10.	CLRI	A novel process for preparation of dyed leather in more than one tone.	2000	0.40
11.	CLRI	A process for the preparation of a novel peptide derivative exhibiting in vitro inhibition of platelet aggregation and antimicrobial activity.	1996-97	2.50
12.	CLRI	A process for the synthesis of a novel dipeptide derivative exhibiting in vitro fibrinolytic activity	1996-97	2.50
13.	CLRI	A process for the preparation of tetraphenylethane based polyurethane macroiniferter for living radical polymerisation.	1996-97	0.50
14.	CLRI	An improved process for the preparation of polyurethane-polyvinyl multiblock copolymers using living radical mechanism	1996-97	0.55
15.	CLRI	A novel process for the preparation of an acrylic block copolymer resin emulsion	1996-97	0.75
16.	CLRI	A process for the preparation of a novel epoxy resin for industrial applications	1997	0.50
17.	CLRI	A process for the preparation of novel organo-metallic polymeric matrix for industrial applications and the matrix prepared thereby.	1998	0.50
18.	CLRI	A process for the preparation of protein hydrolysate from proteinaceous chrome wastes.	1999	0.70
19.	CLRI	An improved process for the preparation of a tanning agent.	1999-2000	0.55
20.	CLRI	An improved process for the preparation of a novel graft copolymer having molecular weight upto 300 000.	2000	0.75
21.	CLRI	A process for the preparation of a novel proteinoid-acrylate composite having	2000	0.75

Sr. No	Name of lab/ Inst.	Name of technology	Year of Development	Cost of development *(Rs in lakh)*
		molecular weight in the range of 15000-20000 KD.		
22.	CSMCRI	Potash Alum from mixed salt	1975-76	NA
23.	RRL-T	Manufacture of Anorin-53	1996-97	3.00
24.	RRL-T	Manufacture of low smoke flame retardants for EVA cable containing Anorin-53	-do-	15.00
25.	RRL-T	Manufacture of Anorin-35	-do-	1.50
26.	RRL-T	Manufacture of long life low fade brake linings based on Anorin-35	-do-	9.50
27.	RRL-T	Manufacture of Anor dust	-do-	0.75
28.	RRL-T	Manufacture of Anorin –44	-do-	1.50
Commercial evaluation/field trials/validation/optimization required				
29.	CFTRI	Air classifier	Before 1996-97	NA
30.	CFTRI	Jacketed press for solid/liquid separation		
31.	CFTRI	Design on spouted Bed Coffee Roaster		
32.	CFTRI	Premix-baked foods-bread, biscuit & cookie		
33.	CFTRI	Pheromone traps: for T castaneum		
34.	CFTRI	Fruit juice concentrate/paste (Apple, mango, orange & pineapple)		
35.	CFTRI	Amla products		
36.	CFTRI	Quick cooking Rice		
37.	CFTRI	Roller flaker		
38.	CFTRI	Rice bran wax sludge		
39.	CFTRI	Ready mix: flavoured flan		
40.	CFTRI	Ready mix: cake doughnut		
41.	CFTRI	Ready mix: combination doughnut		
42.	CFTRI	Orange peel curry/chutney		
43.	CFTRI	Snack food (soy based)		
44.	CFTRI	Fish waste silage		
45.	CFTRI	Poultry intestine: silage		
46.	CFTRI	Traditional HAE/RTC Meat & Poultry products		
47.	CFTRI	Silkworm Pupae Silage		
48.	CFTRI	Lipid emulsion-Parenteral Food		
49.	CFTRI	Raw Mango cutting machine	2000-01	200.82
50.	CFTRI	Forming and frying equipment		
51.	CFTRI	A process for manufacture of bio fumigants for protection of stored grains from food grade flavours.	2000-01	88.82
52.	CFTRI	Technology package for modified atmosphere packaging of vegetables	1996-97	30.65
53.	CLRI	A novel process for the preparation of an eco-friendly black colorant from	1996-97	1.00

Sr. No	Name of lab/ Inst.	Name of technology	Year of Development	Cost of development *(Rs in lakh)*
		myrobalan sludge for use in leather industry.		
54.	CLRI	A Process for the preparation of a novel fibrin for material application and the fibrin prepared thereby.	1996-97	0.25
55.	CLRI	A process for the preparation of an improved bone implant and the bone implant produced thereby.	1997	0.25
56.	CLRI	A process for the preparation of novel bio-inorganic composite useful for bone substitution and the composite produced thereby.	1997-98	0.25
57.	CLRI	A process for the preparation of an alkaline protease.	1998-99	0.40
58.	CLRI	A process for the preparation of a novel synthetic tanning agent	2000	0.30
59.	CLRI	A process for the preparation of transparent soft collagen film	2000	0.45
60.	CLRI	A process for the development of high performance bentoniteacrylic graft copolymers as filler cum retanning agent for leather applications.	1996-97	0.60
61.	CLRI	A process for the preparation of a novel fibrin powder for medical applications.	1996-97	0.50
62.	CLRI	A process for the preparation of novel fibrin sponge for medical applications and the fibrin prepared thereby.	1996-97	0.45
63.	CLRI	An improved process for the preparation of composites such as particle boards/laminates	1990	0.65
64.	CLRI	A process for the preparation of novel crosslinked collagen sheet from a collagenous source for medical applications and the sheet produced thereby.	1998	0.60
65.	CLRI	A process for the preparation of a novel chromium-iron complex for use in leather industry and the novel chromium-iron complex prepared thereby.	1998	0.50
66.	CLRI	An improved process for the preparation of a hydrophilic bone morphogenetic protein from calcified tissue useful for medical applications and the hydrophilic bone morphogenetic protein prepared thereby.	1998	0.60
67.	CLRI	A process for the preparation of a novel conducting fibrous composite for electromagnetic interference (EMI) shielding applications.	1998-99	0.40
68.	CLRI	Diabetic Footwear	2001-02	1.00
69.	CSMCRI	Preparation of high purity tetra bromo bis phenol-A	1999-2000	20.00
70.	CSMCRI	Rubber and paint grade calcium carbonate from industrial waste	1998-99	21.14
71.	CSMCRI	Industrial grade salt from subsoil brine	1996-97	50.00
72.	CSMCRI	Integrated process for recovery of marine chemicals	1999-00	
73.	CSMCRI	Tissue culture for jojoba	1999-00	93.39
74.	IICB	Process for preparation of technetium-99m phenoxy carbonyl methyl imino diacetic acid	1997	24.00

Sr. No	Name of lab/ Inst.	Name of technology	Year of Development	Cost of development *(Rs in lakh)*
75.	IICB	An alcoholic extract of fresh human placenta meant for treating skin disfiguring disease vitiligo	1997	45.00
76.	IICB	Process for preparation of non toxinogenic oral vaccine for cholera	1998	N.A.
77.	IICB	Liposomal primaquine for the treatment of experimental leishmaniasis	2000	N.A.
78.	RRL-Bho	Improved farm Implements	1995-96	9.19
79.	IICT	Organo-tin compounds	1995-96	-
Upgradation required				
80.	CFTRI	Process standardised for preparation of water soluble yellow colourant formulations from curcumin removed turmeric oleoresin.	2000-01	112.86
81.	CFTRI	Different approaches for enrichment of chilli colour	2000-01	
82.	CFTRI	A new approach for preparation of copper chlorophyll complex from alfalfa.	2000-01	
83.	CSMCRI	Halogen scavenger grade synthetic hydrotalcite	1997-98	
84.	CSMCRI	Process for pharma grade heavy basic magnesium carbonate	1997-98	63.03
85.	IICB	Ultra-sensitive Dot-ELISA or ELISA for detection of biologically important molecules	1997	20.00
86.	IICB	Process for preparation of enzymes containing xylanase and alpha-arabinofuranosidase suitable for bakery industry	2000	20.00
87.	RRL-Bhu	Extraction of metal values from polymetallic nodules	N.A	N.A

Technol ;ies for which year of development is not available, is taken as developed prior to 1996-97

III. Process of transfer under way

Sr. No	Name of lab/ Inst.	Name of technology	Year of Development	Cost of development *(Rs in lakh)*
Exploring market				
1.	CFTRI	Onion and garlic chips	1998-99	
2.	CFTRI	Instant mixer for gooseberry chutney and soup	1998-99	
3.	CFTRI	Gooseberry paste confection	1998-99	
4.	CFTRI	Incorporation of bulk sucrose alternatives in Laddu, Jamun, rasgolla	1998-99	37.68
5.	CGCRI	Erbium doped fibre for use as optical amplifier	1997-98	35.00
6.	CIMAP	Natural mosquito and insect repellant	1997	About Rs. 20 lakh on all development
7.	CIMAP	Herbal pain balm	1997	
8.	CIMAP	Herbal cream for skin care	1999	
9.	CIMAP	Herbal liquid dentrifrices for quick pain relief and refreshing oral cavity	2000	
10.	CIMAP	Natural herbal tooth powder	1999	
11.	CIMAP	Insecticide herbal formulation	2000	
12.	CIMAP	Process for liver protective drug from cleame viscosa	1992-93	20.40
13.	CIMAP	Formulation of pest repellent for stored products	1994-96	4.33
14.	CIMAP	Repellent for house flies	1995-96	3.56
15.	CIMAP	Formulation for stored grain products		
16.	IICB	Detection of endotoxin	1996	10.00
17.	IICB	Detection of minimum residual disease in acute lymphoblastic leukemia	1996-97	20.00
18.	IICB	Non-specific immuno modulators based on the processing of protozoan cell body proteins-lipid-carbohydrate constituents	1997	5.00
19.	IICB	Software package MODELYN: A molecular modelling program (Version PC-1.0)	1998	20.00
20.	IICB	A process for the preparation of a novel saccharifying amylase useful for starch saccharification	2001	20.00
21.	IICB	A process for the production of an enzyme preparation containing xylanase and carboxymethycellulase useful for the treatment of textile, agro-products and plant biomass	2001	20.00
22.	IICB	A process for preparation of cellulase free xylanase	1996-97	20.00

Sr. No	Name of lab/ Inst.	Name of technology	Year of Development	Cost of development *(Rs in lakh)*
23.	IICB	A highly cost-effective analytical device for performing immunoassays with ultra high sensitivity	2002	N.A.
24.	IICB	A novel in vitro method to generate dendritic langerhans type cells using platelets	2001	N.A.
25.	IICB	A protein from the coelomic fluid of an Indian earthworm that causes immotility of sperms	2001	N.A.
26.	IICB	An improved formulation for the treatment of Asthma	2001	N.A.
27.	IICB	Development of vaginal contraceptive with clove oil	2001	N.A.
28.	IICB	Regulatory sequence elements of the cold inducible gene from the psychrotrophic bacterium pseudomonas syringae	2001	N.A.
29.	IICB	Calcium binding properties of a crystallin	2002	N.A.
30.	IICB	Crocodilian c-crystallin: overexpression, purification and characterization	2002	N.A.
31.	IICB	Two novel GnRHs from Indian murrel brain; highly potential molecules for induced breeding of fish	2002	N.A
32.	IICB	A new cell secreting insulin	2002	NA
33.	IICB	Anti peptic ulcer activity of an extract of a plant flower	2002	NA
34.	RRL-Bho	Bushes for sugar mills	2001-02	16.25
35.	RRL-Bho	Tribo components for mining sector	2001-02	40.00
36.	RRL-Bho	Paint for building application using fly ash	1998-99	20.21
37.	CLRI	A process for the preparation of plant based acrylate composite	2000-01	N.A.
38.	CLRI	A process for the preparation of novel polysuylfide copolymers	2001	N.A.
39.	CLRI	A process for the purification of E.coli contaminated water for reusable option	2000-01	N.A.
40.	CLRI	An improved device for leather processing	2001	N.A.
41.	CLRI	Preparation of plant based reconstituted collagen substratum	2001	N.A.
42.	CLRI	A process for the preparation of novel proteinoid for industrial applications	2001-02	N.A.
43.	CLRI	An improved process for making chrome tanned leathers	2001-02	N.A.
44.	CLRI	A process for the preparation of a novel synthetic aluminium tanning agent	2001-02	N.A.

Sr. No	Name of lab/ Inst.	Name of technology	Year of Development	Cost of development *(Rs in lakh)*
45.	CLRI	A process for the preparation of a material for making impression of an object	2001-02	N.A.
46.	CLRI	Process for the preparation of a novel chemically modified fibrin-fibrillare protein (FFP) composite sheet	2001-02	N.A.
47.	CLRI	A process for the preparation of alkaline protease and its ecofriendly application in the pretanning processes of leather manufacture	2001-02	N.A.
48.	CLRI	An improved device to detect magnetic resonance in the time domain.	1996-97	N.A.
49.	CLRI	An improved device for electron paramagnetic resonance imaging	2000	N.A.
50.	IICT	Pre-treatment of Rice Bran Oil	2000	NA
51.	IICT	Propheno Phos	2001	NA
52.	IICT	1,2,4 Trizole	2001	NA
53.	RRL-Bhu	Improved cook-stoves	N.A	N.A
54.	RRL (J)	Appropriate technology for utilisation of betel nut husk	2000-01	-do-
Negotiations underway				
55.	CLRI	A process for the preparation of reconstituted collagen-sponge	1999	0.35
56.	CLRI	An improved tanning device	2000	0.45
57.	CLRI	A process for the preparation of ionically charged collagen sponge.	1999	0.65
58.	CLRI	A process for the preparation of a Parchment like material	2000	0.50
59.	CLRI	Bio-processing of Leather	2001-02	2.00
60.	CLRI	Enzyme from plant/animal source for unhairing of hides/skins	2001-02	0.20
61.	CLRI	Polymeric syntan	2001-02	N.A.
62.	CSMCRI	Scaled up TFC membrane production with reproducible performance	1996-97	56.78
63.	IICB	Process for isolation of an active principle from azadirachta indica useful for controlling gastric hyperacidity and gastric ulceration	1996	50.00
64.	IICT	Sorbitol from dextrose monohydrate	-	NA
65.	IICT	Temperature sensitive labels	2000-01	42.50
66.	NML	Ceramic tiles from ferrochrome & other industrial wastes	1997-98	4.00
67.	NML	Wear resistant ceramic products using fly ash	1997-98	4.50
68.	NML	High temperature ceramic material	1997-98	4.50
69.	NML	Production of low carbon ferrochem	1998-99	2.0
70.	NML	Iron sillicon magnesium alloys	1998-99	3.00

Sr. No	Name of lab/ Inst.	Name of technology	Year of Development	Cost of development *(Rs in lakh)*
71.	NML	Nickel magnesium alloys	1998-99	3.00
72.	NML	High purity magnesium carbonate/magnetia from magnesite	1998-99	3.00
73.	NML	Process for production of zinc powder from zinc dross	1998-99	2.50
74.	NML	Recycling of vanadium plant effluent	1998-99	2.50
75.	NML	Flux for magnesium alloys	1999-2000	0.50
76.	NML	Solution useful to establish superiority of corrosion resistance steels	1999-2000	1.00
77.	NML	Reduction grade iron powder	1999-2000	2.00
78.	NML	NML Pikasurf	1999-2000	1.00
79.	NML	Ramming masses used in induction furnace	1999-2000	1.00
80.	NML	White portland cement for mosaic and tiles applications	2000-01	2.00
81.	CCMB	PCR based markers for determining hybrid rice purity	1998-99	NA
82.	CCMB	Cost effective fish feed	1998-99	NA

Technologies for which year of development is not available, is taken as developed prior to 1996-97

ANNEXURE –IV

STATEMENT SHOWING OUTSTANDING ROYALTY/PREMIA

(Rs. in lakh)

Laboratory	Number of cases	Amount of Royalty/Premia outstanding (as of March 2002)
CBT	1	15.48
CIMAP	5	04.80
CSMCRI	4	55.05
IICT	1	13.00
ITRC	1	11.25
NCL	5	35.00
Total	**17**	**134.58**

CHAPTER 3 : MINISTRY OF SCIENCE AND TECHNOLOGY

3.1 Department of Biotechnology

The Department of Biotechnology (DBT), under the Ministry of Science and Technology was set up in February 1986 to give an impetus to the development of biotechnology in the country. The objectives of DBT include the development of products, processes and technologies whose large-scale applications would result in societal and economic benefits. The biotechnology programmes are implemented through a number of autonomous and statutory institutions/universities by giving them grants-in-aid. Over a period of 1996-2002, DBT worked on 1375 projects. Of these, 250 projects were studied in audit. In 34 projects involving releases of Rs 6.10 crore the envisaged objectives were not achieved or were partially achieved. In 80 projects involving releases of Rs 15.39 crore lapses in project management were observed and in 18 projects involving an expenditure of Rs 3.51 crore, technologies were developed but could not be transferred to the industry. The Mission Mode Project on Semi-Intensive Prawn Aquaculture could not be implemented at two of the seven sites and in four sites, the project failed to achieve all its objectives. In another Mission Mode Project 'Technology development and demonstration of Biofertilizer', the standardization of protocols to transfer the technology from the laboratory to farmers' fields could not be achieved. Out of 41 technologies transferred to industries for commercialisation between 1986 and 2001, only two technologies were in commercial use at present.

Highlights

■ **Out of 250 project files studied in audit, comprising 18 percent of the total projects in DBT, the envisaged objectives were not achieved or were partially achieved in 34 projects (14 *per cent*) involving releases of Rs 6.10 crore.**

■ **Lapses in project management were observed in 80 projects involving releases of Rs 15.39 crore. These included 17 projects not reviewed annually, 12 projects where Task Force recommendations were not implemented, 24 projects in which project completion report (PCR) and consolidated UC were not received, 6 projects in which PCR was received but not evaluated, 10 projects terminated midway, 6 projects where the PI left midway and 5 overlapping projects.**

■ **In eighteen projects involving an expenditure of Rs 3.51 crore, technologies were developed but could not be transferred to the industry.**

■ **Mission Mode Project on Semi-Intensive Prawn Aquaculture could not be implemented at two of the seven sites. In four of the remaining five sites, the project failed to achieve all its objectives even after delays ranging between two to three years.**

■ **The ultimate objectives of developing female and male vaccines (βhCG, oFSH & Anti-VCP/RCP) could not be achieved fully even after incurring an expenditure of Rs 13.78 crore during 1987-2001.**

■ **The standardization of protocols to transfer the technology from the laboratory to farmers' fields under the Mission mode project 'Technology development and demonstration on biofertilizers' could not be carried out even after incurring an expenditure of Rs 5.30 crore.**

■ **From its inception in 1986 till March 2002, DBT transferred 44 technologies to industries for commercialisation. Eight out of the ten technologies developed from DBT supported projects and transferred between 1986-1996 are currently not in commercial use. Of 24 technologies transferred between 1996 and 2001, DBT furnished the information regarding only 18 technologies and none of these technologies except two had reached the commercial stage as yet.**

■ **Funds to the tune of Rs 42.36 lakh were blocked for over a decade with NCSM, Kolkata and unfruitful expenditure of Rs 2.89 crore was incurred under the Antibiotics Development Consortium project.**

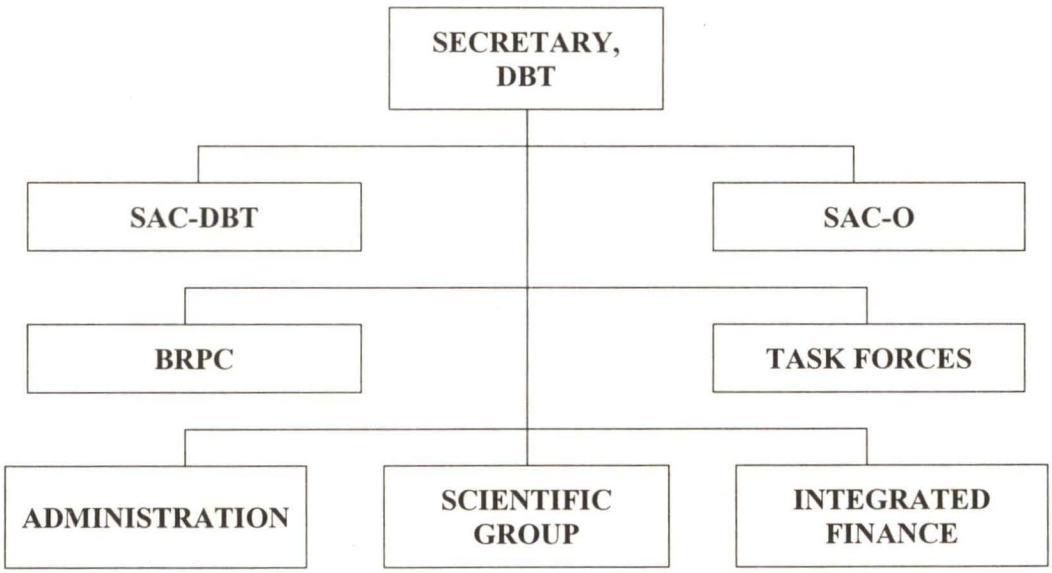
3.1.1 Introduction

The Department of Biotechnology (DBT), under the Ministry of Science and Technology was set up in February 1986 to give an impetus to the development of biotechnology in the country. The objectives of DBT include

the development of products, processes and technologies whose large-scale applications would result in societal and economic benefits. The biotechnology programmes are implemented through a number of autonomous and statutory institutions/universities by giving them grants-in-aid.

3.1.2 Organizational structure

DBT is headed by a Secretary and functions with the advice of two high powered committees, viz., the Scientific Advisory Committee (SAC-DBT) and Standing Advisory Committee-Overseas (SAC-O). In addition, a Biotechnology Research Promotion Committee (BRPC) and 15 expert Task Forces comprising eminent scientists, provide advice to the department in the pursuit of its goals to promote R&D activities in the country. The organizational structure is as follows:



3.1.3 Scope of audit

The present review focuses on the funding of projects under DBT's various Task Forces including planning, monitoring, implementation, achievements and end use of technologies developed during the period 1996-2002.

3.1.4 Project Management

The process followed for planning and monitoring of projects in DBT is briefly described below:

- The project proposal is received by DBT from Project Investigator/ Implementing Agency (**PI/IA**). After the proposal is screened, it is reviewed by the concerned experts. Subsequently, the proposal is placed before the concerned Task Force Committee meeting along with the views of the experts for final approval.

- After a project is sanctioned and funds released, half yearly/annual progress reports including annual Utilization Certificate/ Statement of Expenditure (UC/SE) and list of assets are required to be received by DBT from the concerned Project Investigator/ Implementing Agency. The progress of each project is also required to be reviewed at least once a year by the concerned Task Force Committee.

- Any extension / additional cost for the approved project requires the approval of the Task Force / DBT. On completion, the final Project Completion Report (**PCR**) along with consolidated UC/SE is to be received by DBT. The PCR is required to be evaluated by the Task Force Committee/ Experts.

During 1996-2002, DBT worked on 1375 projects, of these, 250 projects studied in detail

Over the period 1996-2002, DBT worked on 1375 projects, of which 361 projects had been carried over from 1995-96. Task Force-wise position is indicated in **Annexure 1.** Of these, 676 projects were completed (49 *per cent*) during 1996-2002. Out of the total of 1375 projects, 250 projects (18 percent) were studied in detail.

3.1.4.1 Non-achievement of objectives

Out of 250 projects, envisaged objectives unachieved or partially achieved in 34 projects involving releases of Rs 6.10 crore

Out of 250 project files studied in audit, the envisaged objectives were not achieved or were partially achieved in 34 projects (14 per cent) for which Rs 6.10 crore were released. The list of such projects is given in Annexure 2.

Some of these projects are discussed below:

(a) In March 1996, DBT sanctioned a project entitled 'Phenotypic plasticity and role of cellular calcium in dictyostelium discoideum' in the field of Basic Research in Modern Biology to be implemented by the Indian Institute of Science, Bangalore. The objectives of the project were:

(i) to estimate the degree of genetic relatedness between the amoebae that constitute a single multicellular unit (a social colony);

(ii) to monitor the spatial and temporal patterns of calcium in single cells and aggregates;

(iii) to study the relationship between cell cycle phase at starvation, cell calcium and cell fate;

(iv) to look for genes that might be involved in mediating the above effects of calcium.

Three out of four objectives of the project worth Rs 30.48 lakh could not be achieved

The sanctioned cost of the project was Rs 34.37 lakh with a duration of three years. Against a release of Rs 30.48 lakh, an expenditure of Rs 28.83 lakh was incurred on the project. A study of the project file revealed that eight equipments were procured at a cost of Rs 18.82 lakh. Of these, three costing Rs 0.91 lakh could not be utilised on the project at all, as they were installed only after closure of the project, while one was installed a month before completion of the project. The project was neither reviewed by DBT during its entire duration, nor evaluated after its completion. PI, in the PCR, stated in August 1999, that out of the four objectives, he could not achieve the first, third and fourth objectives. While accepting the facts, DBT (November 2002), stated that the proposed objectives were overambitious and hence all the objectives could not be achieved. Evidently, a realistic assessment of the time-frame of the project was not made.

DBT sanctioned a project for a period of three years to achieve seven objectives

(b) In March 1993, DBT sanctioned a project entitled 'In-vitro technology for micro propagation and selection of salt tolerance cell lines of heitera and nypa of Sundarban' in the field of Plant Biotechnology to be implemented by Vidhan Chandra Krishi Vishwavidyalaya, Kalyani (West Bengal). The original objectives of the project were :

(i) To identify and establish the ideal explants for *in vitro* cultivation,

(ii) To standardize the protocol for suspension culture and induction of soma clonal variation for salt tolerance,

(iii) To screen for tolerance at different regimes of salinity and the influence of different salts on embryogenesis and regeneration,

(iv) To study physiological parameters of the selected cell zones contributing to salt tolerance/avoidance,

(v) To study the cytological, anatomical and histochemical properties for organigenesis/embryogenesis during process of dedifferentiation and redifferentiation,

(vi) To standardize protocol for multiple bud/shoot formation and its subsequent multiplication and establishment,

(vii) To study the fungal/bacterial interaction in having an axenic plant parts (auxiliary/apical buds) and their maintenance under *in vitro* system.

The sanctioned cost of the project was Rs 14.80 lakh plus salary component, with duration of three years, against which Rs 15.38 lakh was released between March 1993 and July 1999. In February 1994, PI left the university. Six months later, in September 1994, DBT appointed another PI for the project. However, there was no progress on the project. The entire grant remained unspent till February 1996 when the Task Force reviewed the project. In February 1996, DBT extended the project on return of the original Project Investigator for three more years with effect from March 1996 at the original cost with modified objectives which were:

Project was extended for another three years with only three modified objectives

(i) To identify and establish the ideal explants for *in vitro* cultivation,

(ii) To standardize the protocol for suspension culture and induction of variations for salt tolerance,

(iii) To standardize the protocol for micropropagation following multiple bud formation with an efficient rooting system.

Not much success was achieved under the project even after extension and spending Rs 15.38 lakh

While the entire amount had been spent by March 1997, the Task Force while reviewing the completion of the Project in September 1999 observed that not much success had been achieved. DBT stated (November 2002) that very few laboratories were working on mangroves and that any leads obtained would be beneficial to promoting research in this area.

(c) In December 1997, DBT sanctioned a project titled 'Application of biotechnology and molecular biology in the resource exploration and sustainable management of Sundarbans Mangroves' to a NGO 'Susama Devichowdhurani Marine Biological Research Institute', Sagar Island, West Bengal at a cost of Rs 46.10 lakh. The objectives of the project were:

(i) To screen the microbiological populations, their quantitative and qualitative estimation as well as physiological grouping and to monitor their activities under coastal ecosystem with special reference to plant, nutrient mobilization like biological nitrogen fixation, actinorhizal association, essential bioactive indigenous resources etc. by classical and recombinant DNA methods,

(ii) To investigate the effect of introduction of exotic flora in Sundarbans mangrove ecosystem,

(iii) To develop culture technology for Carcinoscorpious rotundicauda and Tachypleus gigas- suited to Sundarbans environment and to undertake R&D effort for cell culture of amoebocyte and cloning of factor C through recombinant DNA technology,

(iv) To develop location specific culture technique for edible oyster.

An NGO was sanctioned a project and released grant of Rs 49.29 lakh, in excess of sanctioned cost which could not achieve the envisaged objectives

The NGO had not yet been registered, when the PI submitted the project proposal in December 1995 to DBT as its Secretary. DBT released Rs 49.29 lakh between October 1997 and July 2000, which was in excess of the sanctioned amount. It was also seen that Rs 7 lakh was released on account of overhead charges in excess of the admissible limit of Rs 2 lakh. The PI was required to conserve 2-3 endangered/ economically important species and develop Eco-restoration technology. Till March 2000, the PI had spent Rs 41.06 lakh on the project. In December 2000, while reviewing the progress of the project, the Task Force felt that the project lacked focus. The Project Completion Report and the final Utilisation Certificate were yet to be received (November 2002). While accepting the facts, DBT stated in November 2002 that it was proposed to conduct an on-the-spot review of the project through a Scientist from the Bose Institute, Kolkata.

3.1.4.2 Project Monitoring

Lapses in project management were observed in 80 projects involving release of Rs 15.39 crore

Out of 250 project files scrutinized in audit, lapses in project management were observed in 80 projects on which Rs 15.39 crore was released. This included 17 projects (Rs 3.22 crore) which were not reviewed annually, 12 projects (Rs 1.37 crore) where the Task Force recommendations were not implemented, 24 projects (Rs 4.16 crore) in which Project Completion Report (PCR) and consolidated UC were not received, 6 projects (Rs 1.35 crore) in which PCR was received but not evaluated, 10 projects (Rs 1.50 crore) terminated midway, 6 projects (Rs 1.53 crore) where the PI left

midway, and 5 overlapping projects (Rs 2.26 crore). The details are given in Annexure 3.

Some cases are discussed below:

(A) Project terminated midway:

Despite negative comments of experts, the project was sanctioned to BCST which had to be terminated after about two years

In March 2000, DBT sanctioned a project entitled 'Conservation and utilization of indigenous variability in horticultural and plants of economic importance of Bihar' to the Biotechnology Application Centre, Bihar Council of Science & Technology (BCST), Patna for a period of 3 years. The sanctioned cost of the project was Rs 165.56 lakh and DBT released Rs 5.00 lakh in March 2000. Even when the project proposal was being processed, experts had commented in October/November 1997 that the PI and Co-PI had no experience in the area of plant tissue culture and horticulture and moreover they had no back ground of biological sciences. In November 2001, Task Force (BRPC) was informed that there had been no progress under the project. The council had in July 2001 assured a visiting DBT team that the project would be implemented within two months. However, no progress was made in the project. In view of the same, BRPC recommended in November 2001 the termination of the project with immediate effect. Accordingly, DBT terminated the project in January 2002 and also requested BCST to refund the entire grant released by it. DBT accepted the facts and stated (November 2002) that BCST had been asked to refund the entire grant of Rs 5.00 lakh.

(B) Overlapping projects sanctioned:

DBT sanctioned an overlapping project by overruling the advice of its Sub-group on Human Genetics'

In December 1996, DBT sanctioned a project entitled 'To establish genetic clinics, diagnostic laboratory and counselling for genetic diseases in Western India' to B.J. Wadia Hospital, Mumbai in the field of Medical Biotechnology. The cost of the project was Rs 28.76 lakh with a duration of three years. An expenditure of Rs 28.80 lakh was incurred against release (1996-2000) of Rs 28.49 lakh. When the proposal was processed (February 1996), it was pointed out by the Sub-group on Human Genetics that there was significant overlapping in the objectives of the project with those of projects sanctioned to other centres. It was also suggested that appropriate policies be framed to avoid support to overlapping projects. However, the project was sanctioned overruling the advice. Further, the centre established under the project was not taken over by the hospital and therefore it is not clear whether it was being appropriately utilised. In November 2002, DBT stated that the possible

overlapping of genetic diseases to be studied in the country, in different regions was inevitable. However, it was noticed that there had been overlapping in some of the diseases to be studied at the 'Institute of Immunohaematology' and 'B.J. Wadia Hospital', both of which were located in Mumbai.

(C) Another case of inadequate monitoring:

Project sanctioned for three years, was never reviewed. PCR still awaited

In March 1996, DBT sanctioned a project entitled 'Conservation of Biodiversity: Biotechnological approaches in characterization of mangrove microbial eco-system in Bay Islands' in the field of Biodiversity Conservation and Environment. The project was to be implemented in the Central Agricultural Research Institute (CARI), Port Blair, Andaman and Nicobar Islands. The duration of the project was three years and the cost was Rs 28.34 lakh (including Rs 18.29 lakh for seven equipments). Rs 22.17 lakh was released in March 1996. The project was not reviewed by DBT during its entire duration though it was to be subject to annual review. In March 1999, the PI sought an extension for one year, which was not granted. DBT in April 1999 called for the progress report and work plan, which were not sent by the PI. Final Utilisation Certificate and Project Completion Report were also not received. While accepting the facts, DBT stated in November 2002 that the PI had retired and the Co-PI who took over the project, had also been shifted. DBT stated that it had taken up the issue with CARI as well as the institution to which the Co-PI had been transferred.

3.1.4.3 Non transfer of technology

Developed technologies, under 18 projects worth Rs 3.51 crore, could not be transferred to industry

Out of 250 project files scrutinised, in eighteen projects, involving an expenditure of Rs 3.51 crore, technologies were developed but could not be transferred to the industry (Annexure 4). One such case is discussed below:

Technology developed under the project could not be transferred due to failure on the part of DBT

In March 1992, DBT took up a project entitled 'Carp seed production in a controlled environment system for developing aquaplosion serving as a subsidy to the stressed eco-system in Western Rajasthan' at a cost of Rs 8.57 lakh for a period of three years, later extended to 54 months. An expenditure of Rs 9.84 lakh was incurred on the project. Seed production technology was developed in the project. The PI reported in his interim report that the complete project report could not be prepared as the further instalment of grant was delayed by DBT. While reviewing the interim report in January 1997, the Task Force suggested taking steps to transfer seed production technology to

entrepreneurs to enhance seed availability in the region. However, DBT failed to ensure the transfer of the said technology. After the issue was raised by Audit, DBT addressed the PI (October 2001 and August 2002) to obtain his inputs. As of November 2002, DBT had neither obtained the required inputs nor the Final Project Completion Report from the PI. The technology developed could not be transferred. In November 2002, DBT accepted the facts.

3.1.5 Mission Mode Projects

During the period of audit review 1996-2002, four mission mode projects were implemented by DBT. Three of these were reviewed and the audit findings are detailed below:

3.1.5.1 Mission Mode Project on Semi-Intensive Prawn Aquaculture

This project could not be implemented at two of the seven sites at Andaman and Nicobar Islands and Alampur in West Bengal. In four of the remaining five sites, the project failed to achieve all its objectives even after delays ranging between two to three years.

In 1993, DBT proposed a mission mode project on Semi-Intensive Prawn aquaculture with the following broad objectives:

(i) To develop and demonstrate in different agro climatic regions the technology packages of semi intensive farming of P. merguiensis, P. indicus and P. monodon,

(ii) To develop and demonstrate the technology of semi intensive fresh water shrimp farming in M. rosenbergii amd M. malcolmsoni,

(iii) To develop hatchery technology; enhance larval survival,

(iv) To establish brood stock banks and captive brood stock generation systems,

(v) To take up R&D and trials of indigenous feeds,

(vi) To establish diagnostic facilities and develop diagnostic kits for shrimp diseases,

(vii) To monitor ecological parameters and assess environmental impact,

(viii) To provide training to farmers and entrepreneurs with regard to new technology packages,

(ix) To transfer the technology packages to the Ministry of Agriculture, the Ministry of Commerce and other organisations.

A Mission Mode project was to be implemented at seven sites at a cost of Rs 9.91 crore during 1993-97

In February 1994, the Expenditure Finance Committee (EFC) approved DBT's proposal for a Technology Project in Mission Mode to be implemented at seven sites at a total cost of Rs 9.91 crore for a duration of four years (1993-97). Accordingly, DBT sanctioned seven projects in March 1994, four in brackish water/ marine sites and three in fresh water sites as detailed below:

Sl. No.	Name of Site	Implementing Agency	Sanctioned Cost	Amount released	Expenditure incurred *(Rs. in lakh)*
BRACKISH WATER SITES :					
1.	Andaman and Nicobar (A&N) Islands	Marine Products Export Development Authority (MPEDA)	80.65	27.32	Nil
2.	Alampur, West Bengal	MPEDA	224.20	63.15	Nil
3.	South Gulf of Cambay, Gujarat	National Institute of Oceanography (NIO)	117.20	97.64	72.72
4.	Karaikal, in Pondichery	MS Swaminathan Research Foundation	173.54	78.62	66.72
FRESH WATER SITES :					
5.	Bhopal, Madhya Pradesh	MP Council of Science & Technology	98.93	85.83	85.83
6.	Bhubaneshwar, Orissa	Central Institute of Freshwater Aquaculture	191.98	167.11	164.11
7.	Salem, Tamil Nadu	MPEDA	96.55	86.61	126.27

The project failed to achieve its objectives in the above-mentioned sites on account of the reasons given below:

In Andaman and Nicobar Islands, the project could not be taken up as the Andaman and Nicobar Administration did not accord final clearance. In August 2000, the project was terminated. DBT stated in November 2002 that MPEDA had been asked to refund the total amount of Rs 37.08 lakh (including interest of Rs 9.76 lakh).

Project could not be taken up in Andaman and Nicobar (A&N) Islands and West Bengal, as A&N administration/ state government did not accord final clearance

In Alampur, West Bengal, the project could not be taken up as the State Government did not clear the identified project site. In August 2000, the project was terminated as the project area was within the CRZ (Coastal Regulation Zone) and no activity could be initiated there. In March 2002, the implementing agency refunded Rs 75.22 lakh including interest of Rs 12.07

lakh. However, these factors should have been taken into account while selecting project sites, apart from ensuring the support of the concerned State/Union Territory administration.

In South Gulf of Cambay, Gujarat, the project could not be implemented at the selected site as it was within the CRZ. The project was delayed and finally taken up at an alternate site at the National Institute of Oceanography (NIO), Goa. The project was extended till March 2000 but all its objectives could not be achieved. DBT stated in November 2002 that all approved objectives could not be achieved due to restrictions of CRZ.

In Karaikal, Pondichery, the site again had to be changed as the selected site was within the CRZ. The project was delayed and later extended till September 2002.

In Bhubaneshwar, Orissa, the project was delayed and had to be extended up to May 2000. Finally, diagnostic kits for prawn culture could not be developed. DBT did not offer its comments regarding the non-development of diagnostic kits under the project.

In four of remaining five sites, project failed to achieve all its objectives even after delay of two-three years

At Salem in Tamil Nadu, the project was extended only up to March 2000. However, the PI incurred an expenditure of Rs 14.73 lakh even during 2000-01. The objectives of developing a technology package for prawn farming and establishment of a hatchery could also not be achieved. DBT stated in November 2002 that no fresh attempts were made for hatchery establishment due to several constraints and that successful efforts had been made by the PI for demonstration of technology. However, no technology package/ document had been submitted to DBT.

In Bhopal, Madhya Pradesh, the project was extended up to November 2000. However, against a proposed capacity of the hatchery of 10 million Prawn Larvae (m PL), only 0.5 m PL could be established. Final utilisation certificate and other related documents were awaited till November 2002.

3.1.5.2 Development of vaccines for Contraception - a multi-centric study

The ultimate objectives of developing female and male vaccines **(βhCG, *oFSH & Anti-VCP/RCP) could not be achieved fully even after incurring an expenditure of Rs 13.78 crore during 1987-2001.***

DBT supported a Mission Mode project on immunological approaches to fertility control since 1987

Since April 1987, DBT had been supporting the project 'Immunological Approaches to Fertility control' in Mission Mode, which aimed at (i) Development of an anti-fertility vaccine for females based on Beta Human Chorionic Gonadotrophin (βhCG), (ii) Development of an anti-fertility

vaccine for males based on Ovine Folllicle Stimulating Harmone (oFSH) and (iii) Development of an anti-fertility vaccine for females based on Anti-Vitamin Carrier Proteins & Anti-Riboflavin Carrier Protein (Anti-VCP & Anti-RCP).

Mention was made in Paragraph 3.1 of Report No.6 of 1994 of the Comptroller and Auditor General of India regarding the non-achievement of the project objectives within the stipulated date. DBT in reply to the Public Accounts Committee in 1994-95, stated that βhCG (Female anti-fertility vaccine) would be ready for large scale clinical trials (Phase III) by the end of the 'Eighth Plan period'. The position regarding oFSH (Male vaccine) would be clear after the Sub Committee Report and that human trials for Anti Vitamin Carrier Protein Vaccine, might begin by the end of the Eighth Plan period.

Second phase of the project was sanctioned at a cost of Rs 230.74 lakh for three years

In December 1997, DBT sanctioned the Second Phase of the project with the title "Development of Vaccines for contraception – a multi centric study' at a cost of Rs 230.74 lakh for a period of 3 years. The project was extended upto June 2002 at three centres at the Indian Institute of Science, Bangalore, the Institute for Research in Reproduction, Mumbai, the Post Graduate Institute of Medical Education and Research, Chandigarh and upto December 2002 at the National Institute of Immunology, New Delhi. An amount of Rs 147.86 lakh was spent till March 2001 (UC for 2001-02 awaited) under the second Phase, in addition to Rs 1230.50 lakh spent under the first Phase.

All three vaccines for female/male could not be successfully delivered

DBT stated in November 2002, that (i) βhCG had completed Phase II human clinical trials but without enhanced and sustained immune response, the candidate vaccine cannot be tried further on humans, (ii) oFSH had completed Phase I human clinical trials, but the vaccine was found to interfere with the hormonal parameters of men and could cause mutagenic changes. It was, therefore, discontinued for its probable social unacceptability and (iii) anti-RCP vaccine would have to adopt all newer molecular approaches to take care of all basic queries that emerged and were experienced with βhCG and oFSH.

In November 2002, DBT stated that while the three vaccines could not be successfully delivered, the Indian efforts were recognised to be the most advanced contraceptive efforts in the world.

3.1.5.3 Mission mode project entitled 'technology development and demonstration on biofertilizers'

The standardization of protocol to transfer the technology from laboratory to the farmers' field under Mission mode project 'technology development and

demonstration on biofertilizers' could not be carried out even after incurring an expenditure of Rs 5.30 crore

In March 1994, a Mission Mode project was sanctioned at a cost of Rs 903.85 lakh to be implemented at 17 centres within eighth plan period

A Mission Mode Project "for standardization of protocol to transfer the technology from laboratory to the farmers' field", was sanctioned in March 1994, to be implemented by 17 Centres/Implementing Agencies (IAs) at a total cost of Rs 903.85 lakh during the Eighth Plan period with the following objectives: (i) Technology Development based on the R&D efforts for Rhizobium and Blue Green Algae (BGA); (ii) Training of manpower and awareness building, (iii) Limited demonstration for validation of technologies; and (iv) Quality assurance measures through R&D.

Nine institutes participated in the **BGA component**, while eight institutes participated in the **Rhizobium component** of the project. During March 1994-December 1996, Rs 611.33 lakh were released to various Centres / IAs against which Rs 529.93 lakh was spent leaving an unspent balance of Rs 81.40 lakh, which was still retained by 12 Centres. Audit scrutiny revealed that:

Only three institutes could develop the BGA technology and only two institutes could develop the Rhizobium technology

- Only three institutes viz. Madurai Kamaraj University, Tamil Nadu Agricultural University and IARI could develop the BGA technology. However, the technology was yet to be transferred to the fertilizer industry for commercialisation. Only IARI and Regional Research Laboratory (RRL), Jammu could develop the Rhizobium technology. Though RRL signed an agreement with two firms to transfer Rhizobial fertilizer technology for mass production in August 1999, the same could not be achieved till November 2002. IARI did not transfer the technology to the industry for commercialisation.

- Only 17 Regional Quality Assurance centres were being established against the target of 40, resulting in a shortfall of 23.

Technology could not reach farmers' field even after seven years and spending Rs 5.30 crore

In November 2002, DBT stated that efforts were being made to transfer the technology packages to various industries and user ministries but the response was not to the expected level. The fact remained that the technology could not reach the farmers' field even after a lapse of seven years and an expenditure of Rs 5.30 crore.

3.1.6 Transfer of technology for commercialisation

One of the objectives of DBT i.e. 'development of products and processes and technologies whose large-scale applications would result in societal and oeconomic benefits' remained largely unachieved.

Since 1986, DBT transferred 44 technologies for commercialisation

Since its inception in 1986, DBT had transferred 44 technologies for commercialisation. Till November 1996 transfer of technology was being effected by DBT. Later, two independent institutions, National Research and Development Corporation (NRDC) and Biotech Consortium India Limited (BCIL) were assigned this responsibility. The achievement in transfer of technologies is discussed below in two phases, pre-1996 and 1996-2001 when 17 and 24 technologies respectively were stated to have been transferred. The three technologies transferred in 2001-2002 are not discussed in this review.

3.1.6.1 Technologies transferred up to November 1996

Till November 1996, DBT had transferred 17 technologies to industries for commercialisation. Eight out of the ten technologies developed from DBT supported projects are currently not in commercial use while the status of one technology was not available with DBT.

Of 17 technologies, 10 were developed from DBT funded projects. 8 out of these were not in commercial use at present

Out of 17 technologies transferred till November 1996, 10 technologies were developed out of DBT funded projects. Of these 10 technologies, Monoclonals to M 13 phage proteins III & VIII was transferred to M/s. Pharmacia Inc, USA at a lumpsum price of $ 20,000/- and was stated (November 2002) to be in the market. The information in respect of one technology 'Bamboo by tissue culture' developed by the University of Delhi was not made available by DBT. The remaining eight technologies were developed by the National Institute of Immunology (NII) and none of these were in commercial use at present as indicated below:

Incomplete transfer of technology: In the case of two technologies, viz., Typhoid fever detection kit and Hepatitis B detection kit, all the steps of transfer of technology could not be completed. While NII transferred the technologies to industry for manufacture of clones and hybrid cells in November 1991 and 1992 respectively, the amounts due on such transfer (@Rs 2.5 lakh each) could not be realized. Further, the final stage of transfer of technologies i.e. making 3 batches at NII in respect of each technology could not be reached as the diagnostic division of the company to whom technologies were transferred had been wound up. No further steps have been taken by NII/DBT.

Commercial production stopped: In the case of five technologies viz. Pregnancy Slide Test Latex Agglutination, Pregnancy DOT-ELISA, Animal Birth Control Injection (TALSUR), Blood Grouping monoclonals, and Amoebic Liver Abscess detection Kit 1, an amount of Rs 0.93 lakh was realised as royalty. It is evident that these products could hardly make an

impact in the market. NII intimated in July 2002, that commercial production had been stopped with respect to these five technologies.

The licence from the Drug Controller for bulk marketing of the drug was awaited in the case of one technology viz. "Leprosy Immunomodulator"

In November 2002, DBT accepted the facts and stated that most of these technologies were transferred at the time of the infancy of the department *per-se.* However, with this experience the department gained strength in transferring and commercializing the technologies for societal and economic benefits.

3.1.6.2 Technologies transferred after November 1996

Out of 24 technologies transferred (1996-2001), information regarding 18 were made available and none of these technologies except two had reached the commercial stage as yet

Between December 1996 and March 2001, DBT transferred 24 technologies through Implementing Agencies, NRDC/BCIL. DBT could make available the information only for 18 technologies. It was seen that none of these technologies except two had reached the commercial stage as yet.

The commercialisation status of these 18 technologies is given below:

Product not commercialised

12 technologies transferred to industries in 1997-2001 were yet to be commercialised and hence no royalty had been received against these. Of these, in four cases, even the licence fee amounting to Rs 37.00 lakh had not been received against Rs 77.50 lakh due. In six other cases, the agreement stipulated that "if the industry failed to commence the manufacture within twelve months from the date of signing of agreement, the agreement could be terminated". However in these cases while periods ranging from 19 months to 31 months had elapsed since the agreements, industry had failed to commence commercial production. The Department had not taken further action.

Technology transfer process not completed

In the case of four technologies transferred between March 1999 and May 2000, the technology transfer process could not be completed and hence licence fee amounting to Rs 12.95 lakh had not been received against a due of Rs 36.60 lakh.

Technology in commercial use

Two technologies viz, "Process know-how manual for Infectious Bovine Rhinotracheitis (IBR) vaccine", and "Western blot based HIV- I & II" had been commercialised. However, the royalty was yet to be received.

Thus, the objective of DBT i.e. 'development of products and processes and technologies whose large-scale applications would result in societal and economic benefits' remained largely unachieved.

In November 2002, DBT stated, "since the past and present psyche of the Indian industry is not to believe in indigenous technologies, it has taken a much longer time to convince the indigenous industry to believe in the technologies developed by the Indian scientists and now it is slowly picking up when the industry is coming forward to take the indigenous technology, absorb it, perfect it and then commercialise it, which is a lengthy process". It is evident that more focused and concerted efforts need to be taken by the Department to build appropriate linkages with industry and develop commercial platforms for its technologies.

3.1.7 Other interesting points

Irregularity in obtaining Standing Finance Committee (SFC) approval was noticed. Funds to the tune of Rs 42.36 lakh were blocked for over a decade with NCSM, Kolkata. An unfruitful expenditure of Rs 2.89 crore was incurred under the Antibiotics Development Consortium project.

3.1.7.1 Failure to obtain SFC approval

DBT did not obtain SFC approval

In March, 1996, DBT sanctioned a project entitled 'Identification of Ulbrio colerae genes by random genes, by random cloning and sequencing' to the Indian Institute of Chemical Biology, Calcutta at a cost of Rs 80.69 lakh for 3 years under Basic Research in Modern Biology. Though the cost of the project was beyond Rs 50.0 lakh yet approval of the Standing Finance Committee (SFC) was not obtained. In November 2002, DBT accepted the facts.

3.1.7.2 Blocking up of funds

In March 1988, DBT decided to participate, along with six other scientific departments, in setting up a Hall of Science, Technology and Energy (HOSTE), a permanent S&T exhibition at Pragati Maidan, New Delhi. The implementing agency was the National Council of Science Museums (NCSM), Calcutta. The estimated cost of the project was Rs 609 lakh of which DBT's share was Rs 56.93 lakh. DBT released its share to NCSM during 1987-92 without obtaining approval of SFC. Till 2000, DBT did not enquire about the status of the project or for a statement of expenditure. In September 2000, NCSM intimated that Indian Trade Promotion Organisation (ITPO) had not approved the plan of construction of a building for HOSTE. NCSM further

stated that out of the total funds received, it had set up a gallery entitled "Emerging Technologies" at a cost of Rs 197.36 lakh at the National Science Centre, Delhi (NSCD). NCSM asked for the consent of participating departments including DBT, for its decision that instead of a separate HOSTE building, exhibits for the participating departments could be developed and housed in vacant gallery space available in NCSM Centres at Delhi, Mumbai and other places. In July 2001, DBT asked NCSM, Calcutta to submit a Statement of Expenditure. NCSM intimated (October 2001) that out of Rs 56.93 lakh, Rs 14.57 lakh had been spent proportionately towards setting up of the gallery and that the balance of Rs 42.36 lakh of the DBT grant was lying with it. Thus, failure to monitor the project by DBT between 1988 and 2000 led to blocking up of government funds of Rs 42.36 lakh in addition to the objective not being achieved, for over a decade. In November 2002, DBT accepted the facts and stated that it had asked NCSM to refund the balance grant along with interest.

Failure to monitor the project by DBT between 1988-2000 led to blocking up of funds Rs 42.36 lakh

3.1.7.3 Unfruitful expenditure

In March 1990, DBT sanctioned seven proposals under "Antibiotics Development Consortium" at a total cost of Rs 270 lakh for a duration of five years to M/s. Hindustan Antibiotics Ltd. (HAL), Pune. The overall objective of the proposals was to increase the production of Penicillin G with indigenous R&D efforts through PANLAB strains and to make the country self sufficient in Penicillin requirement thus saving valuable foreign exchange. In March 1991, the cost of the projects was revised to Rs 346.00 lakh and a Memorandum of Understanding was signed between DBT and HAL. Funds amounting to Rs 289.00 lakh were released up to March 1992. After utilising the entire funds, HAL requested for the release of the remaining amount of Rs 57.00 lakh which was not released by DBT.

In June 1994, HAL entered into an agreement/Joint Venture, with a Netherland based company 'MAX-GB' for penicillin production as MAX GB strain was yielding 45 mg/ml as compared to 30 mg/ml achieved by PANLAB strain and also had low sugar/phenyl acetic acid/energy consumption.

The project was completed in March 1995 and out of seven projects, only two projects could be established on commercial scale and others though completed, had to be abandoned at pilot stage. A team of DBT officials visited HAL in September 2000 and commented that the commercialisation of these projects was hindered by either MAX GB-HAL Joint Venture or because the products were economically unviable. No action was taken by DBT/HAL to further improve the process to make them commercially viable. The team further noted that with the current use pattern of the fermentor in the R&D

An unfruitful expenditure of Rs 2.89 crore incurred under Antibiotics Development Consortium project

lab/building, there seemed to be an opening for a revival package which could be worked out with the help of a separate expert committee; otherwise equipment costing Rs 289.00 lakh acquired out of DBT grant would be rendered obsolete. However, no action was taken by DBT in this regard.

DBT stated in November 2002 that it had requested HAL to work out the royalties which were due to DBT. Thus, the entire expenditure of Rs 2.89 crore under the project remained unfruitful.

ANNEXURE 1

List of Task Forces & number of projects taken up during 1996-2002

Sl. No.	Name of the Task Force	Projects brought forward	New projects taken up	Completed
(1)	(2)	(3)	(4)	(5)
1.	Agricultural Biotechnology	19	27	16
2.	Animal Biotechnology/Aquaculture & Marine Biotechnology[♣]	22 28	46 40	42 37
3.	Basic Research in Modern Biology	24	95	117
4.	Biodiversity conservation & Environment	19	53	39
5.	Biofertilizers (renamed as "Integrated Nutrient Management")	9	50	22
6.	Biopesticides and Crop Management	57	74	129
7.	Biotechnology based programme for Women & Rural development	-	55	24
8.	Biotechnology Information Centre (BTIC)	3	9	4
9.	Biotechnology Product & Process development / Food Nutrient Security	69	73	13
10.	Biotechnology programmes for development of SC/ST population	7	58	25
11.	Human Genetics & Genome Analysis	2	41	23
12.	Human Resource Development (HRD)[♥]	10	-	On-going
13.	Jai Vigyan Mission (started in 2000-2001)	-	27	4
14.	Medical Biotechnology	20	131	44
15.	Plant Biotechnology / Seri Biotechnology[♦]	72	235	137
	Total	**361**	**1014**	**676**

[♣] Till 1999-2000 Animal & Aquaculture Biotechnology was one Task Force and it was separated (2000-2001) in two: (i) Animal Biotechnology and (ii) Aquaculture and Marine Biotechnology.

[♥] DBT supporting post graduate (MSc./ M.Tech / PG diploma) courses in various Universities / Institutions etc. which are on continuing basis

[♦] Till 1999-2000 Plant Biotechnology and Seri Biotechnology was one Task Force and it was separated (2000-2001) in two: (i) Plant Biotechnology and (ii) Seri Biotechnology

ANNEXURE 2

Objectives not achieved/ Partially achieved

(Rupees in Lakh)

Sl. No.	Name of the Project	Objectives	Sanctioned Cost	Release
1.	Studies on Neuropeptides of Cyanobacteria in the Arabian sea	• Isolation identification and application of toxins from marine cyanobacteria, • Production of antibodies against toxicity of these toxins.[1]	26.49	25.13
2.	Genetic manipulation of seaweeds by cell culture and somatic hybridization	• In vitro culture of wild population of seaweeds and screening desirable strains for large scale culture, • Development of hybrid strains of Gracilaria, Gelidium and Gelidiella species[1], • Selection of hybrid strains for high colloid content, fast growth, higher biomass production and improved quality of colloids[1].	21.38	19.63
3.	Phenotypic plasticity and role of cellular calcium in dictyostelium discoideum	• to estimate the degree of genetic relatedness between the amoebae that constitute a single multicellular unit (a social colony),[1] • to monitor the spatial and temporal patterns of calcium in single cells and aggregates, • to study the relationship between cell cycle phase at starvation, cell calcium and cell fate[1], • to look for genes that might be involved in mediating the above effects of calcium[1].	34.37	30.48
4.	Some studies on the use of sewage for vermi composting	Ecological Objectives: • To help solve the waste disposal problem as this has an immense effect on the environment[2], • To help reduce the pollution levels in Vrishabhavathi river[2], • To further organic farming as an alternative means of agriculture[2], To reduce dependence of farmers on chemicals and thereby help control pollution[2].	4.69	4.69

[1] Objectives not achieved as per the Project Investigators Report/ Task Force Minutes.
[2] Objectives partially achieved as per the Project Investigators Report/ Task Force Minutes/ DBT's reply.

Sl. No.	Name of the Project	Objectives	Sanctioned Cost	Release
		Economical Objectives: • To give economic value to waste by converting it into useful substance i.e. organic manure[2], • To develop the already existing market for vermicompost[2], • To reduce the cost of fertilizers incurred by the farmers by enhancing the use of vermicompost[2], • To develop markets for the by-products of the process of vermicomposting[2].		
5.	Application of biotechnology and molecular biology in the resource exploration and sustainable management of Sundarbans Mangroves	• To screen the microbilogical populations, their quantitative and qualitative estimation as well as physiological grouping and to monitor their activities under coastal ecosystem with special reference to plant, nutrient mobilization like biological nitrogen fixation, actinorhizal association, essential bioactive indigenous resources etc. by classical and recombinant DNA methods[1], • To investigate the effect of introduction of exotic flora in Sundarbans mangrove ecosystem[1], • To develop culture technology for *Carcinoscorpious rotundicauda* and *Tachypleus gigas*-suited to Sundarbans environment and to undertake R&D effort for cell culture of amoebocyte and cloning of factor C through recombinant DNA technology[1], • To develop location specific culture technique for edible oyster[1].	46.10	47.29
6.	Use of the Protozoan Vairimorpha Sp. in the integrated pest management of Helicoverpa Armigera	• Mass production of Vairimorpha sp., • Development of suitable formulations of Vairimorpha sp., • Field demonstration of Vairimorpha formulation in the control of H. armigera[2], • Integration of the Vairimorpha sp. with other methods of PM for effective management of insecticide resistance (IRM) in H. armigera[2].	13.28	7.53
7.	Integrated project on establishment of insect cell lines for biotechnological applications	For 'Mahatma Phule Krishi Vidyapeath : • To establish new cell line from: **a)** Bihar Hairy Caterpillar : Spilosoma obliqua **b)** Fruit sucking moth : Achaea janata **c)** Safflower caterpillar : Prospalata (perigoea) capensis, • Testing of different cell lines for the susceptibility to their respective and other baculoviruses,	51.20	32.27

Sl. No.	Name of the Project	Objectives	Sanctioned Cost	Release
		• Selectively cloning of the cell lines to get high titres of baculoviruses, • Development of mass cell culture system for the growth of baculoviruses, • To develop low cost medium for supporting insect cell growth & • To test the biological activity of baculovirus as produced in vitro vis-a-viz wild strain grown in vivo. For Vittal Mallya Scientific Research Foundation[2] : • Identification of novel secondary metabolites having neuro modulatory activity, from the India neem tree, using neuronal hedronal cell culture in vitro assays, • Analysis of the cellular diversity of Heliothis armigera and Spodoptera litura larval Central Nervous System, • Characterisation of macromolecular modulation by biomolecules using molecular probes, • Immunohistochemical localisation of specific neurotransmitter phenotypes in cultured neurons, • Correlation of domain specific morphological in vitro phenotypes.		
8.	Microbial control of *Plutella Xylostella*	• Survey for isolation of different geographic isolates of GV of *P. xylostella* and genomic characterisation using PCB techniques[2], • To screen different geographic populations of *P. xylostella* for susceptibility to the granulosis virus as well as B.T. (B.t. is included in order to assess the possibilities of development of B.t. resistance)[2]. • To develop techniques for mass production, formulation and field use[2], • To integrate the use of the virus in IPM system for obtaining pesticide residue free cruciferous vegetables[2].	12.58	11.32
9.	Cultivation of Medicinal Plants using Biotechnological Approaches for the Benefit of SC/ST population of the society	• The upliftment of Scheduled Caste/Scheduled Tribes population of the Society and to provide them job opportunity and self-employment[2], • Popularising the method of propagation and extraction of medicinal portion from these growing plants for use in Chronic diseases such as liver infections, gouts, diabetes and old	9.00	5.68

Sl. No.	Name of the Project	Objectives	Sanctioned Cost	Release
		constipation and asthma etc.[2], • Preparing Ayurvedic medicines for the purpose of treatment of chronic disease at low cost so that it can reach the target population of the society[2], • Distribution of Ayurvedic medicines to the target population of the society[2].		
10.	Use of Biotechnology dietary derived supplements in improving health status of SC population of three villages in W.B.	• To improve the nutritional status of children and women of a rural SC. Population by use of high vitamin supplements obtained from biotechnologically developed products of plant origin, particularly Spirulina sp.[2], • To assess the degree of improvement of the nutritional deficiencies after long range (1-2 years) use of these products[2], • To encourage the local population to develop the methods of culturing, processing and using the products[2].	5.35	5.21
11.	Multiplication and field transfer of in vitro and in vivo propagated plants of Chlorophytum borivilianum (Safed Musli) for economic betterment of Tribal Farmers	• To procure "Musli" tuber from identified sources and multiply the same for providing seed material for participating tribal farmers in the subsequent years of the project, • To multiply plants through tissue culture method in the laboratory all the year round and harden them for field transfer[1], • To create partially controlled conditions (temperature + humidity) in the field through sprinkler irrigation system on at least 500 sq.mtr. land (mother plot) for producing Musli tubers on continual basis at Tapovan Ashram[2], • To create a hardening chamber (mist house) of 160 sq. ft.area for hardening the delicate tissue raised plants[1], • To train the participating farmers & layout demonstrations on cultivation of Dholi Musli in a phased manner.	12.20	13.96
12.	Biotechnology Training and demonstration centre for SC/ST Population	• Training in innovative self-employment biotechnological programmes with new skills and income earning opportunities[2], • Commercial production of micropropagated Banana, Sugarcane and Medicinal and	30.00	10.76

Sl. No.	Name of the Project	Objectives	Sanctioned Cost	Release
		Aromatic plants and products through establishment of small scale area specific bioindustries and their utility and application by SC/ST people[2], • Priority training programmes for improvement of skill and information empowerment of women and youth from target population[2], • Develop a resource base and knowledge bank on biotechnology and Rural development. Also to undertake programmes for development of interactive learning packages and expert systems for Biotechnology applications in field for the benefit of SC/ST[2], • Installation of three demonstration units and distillation/extraction unit of medicinal and aromatic plants at the identified villages namely Chincholi and Jewargi[2], • Four hardening units will be installed in four identified villages[2], • Action will be taken in the 2nd or 3rd year of the project to form a cooperative society of the beneficiaries for marketing of the products and handing over of the distillation units as well as hardening units to the society[1].		
13.	Collecting medicinal flora in Herbal Garden, developing cultivation of important plants and developing uniform planting material-Bihar	To be implemented at two locations viz : (i) Chhota Nagpur and (ii) Santhal Pargana District[1] • To develop agrotechnologies after collecting planting material from the Wild, • To collect various populations of the these plants from different locations in India, grow these out and standardise optimal cultivation conditions, • To select for genetically superior types of these plants and develop high quality, genetically uniform planting material.	16.23	13.50
14.	Human Genomic diversity studies in some South East Indian Populations	• To understand the nature and extent of molecular variation in five anthropologically well-delineated endogenous populations (4 tribes and one caste) of South-East India with reference to 16 DNA marker loci (since the distribution of certain loci like alpha and beta globin genes and p53 are related to the action of environmental forces such as diseases, like malaria and cancer, it is also aimed particularly to assess their genetic significance from the point of view	16.56	16.69

Sl. No.	Name of the Project	Objectives	Sanctioned Cost	Release
		of selection)[2], • To distinguish between populations with respect to genomic diversity, • To carry out the genetic distance analysis to determine the population relationships, • To examine and to compare the relative genetic significance of the results of the present data in the light of these of other Indian and world populations from their ethnic point of view.		
15.	Development of an in vitro screening procedure for identifying anti-inflammatory drugs	• To develop an in vitro screening procedure by monitoring the expression of cell adhesion molecules on endothelial cells as well as the adhesion of endothelial cells to leukocytes, • Induce the expression of the cell adhesion proteins, VCAM-1, ICAM-1 and E. Seletin by treating the cells with IL-1, TNF-alpha or bacterial polysaccharides (LPS), • The expression of the cell adhesion molecules will be measured by using reverse transcriptase-polymerase chain reaction (RT-PCR), • Interaction with the group which is producing the compound is important. A dialogue in this connection should also be done with the industry. Interaction with the CDRI, Lucknow is very essential to demonstrate the feasibility. Atleast one of the well known anti-inflammatory compounds must be tried in the system[1].	26.65	25.20
16.	Diagnosis, treatment and prevention of Kala-Azar employing A 9-0-acetyl sialic acid binding lectin	• Development of a specific and sensitive, non-invasive test for diagnosis of kala-azar. Broadly, the study will include[2]: -Detection of VL patients (minimum 500) over an extended period. This will be correlated with clinical findings, -Identification of this key marker "9-O-AcSG" on the surface of erythrocytes, lymphocytes and monocytes-macrophages, -Determination of the level of this cell surface marker with progression of the disease. • Understanding the underlying biochemical basis and physiological importance of the 9-O-AcSG on the erythroctes, lymphocytes, monocytes-macrophages of kala-azar patients. The principal approaches will be: -Purification and characterization of specific 9-O-AcSG from the cell surface of erythrocytes, lymphocytes and macrophages by biochemical and immunochemical techniques, -Development of monoclonal antibody (MoAb) against 9-O-AcSG,	13.91	13.91

Sl. No.	Name of the Project	Objectives	Sanctioned Cost	Release
		-Epitope mapping of purified O-AcSG with the help of a panel of MoAbs, -Selected MoAb will be used subsequently for drug targeting , -Development of an ELISA employing the selected MoAb. Its efficacy will be compared with ATNH for the detection of low levels of O-AcSG. The affinity constant of the MoAb with its ligand (k=10 M-10 M) is expected to be much higher than that of ATNH (k=10^{-3} M) (14, 43) • Development of an animal model: -Early identification of 9-O-AcSG on the erythrocytes, lymphocytes and monocytes-macrophages, -Correlation of level of 9-O-AcSG with the parasite load i.e. before, during and after treatment -Use of drug conjugated MoAb, -Study the receptor-ligand interaction.		
17.	Reversal of multi-drug resistance by phenoxazines in mice bearing human tumor xenografts	• To develop a model where resistant and sensitive human solid tumours will be grown as xenografts subcutaneously in the opposite flanks of the mouse[1], • To characterise the Xenografts for their histopathlogical parameters and chromosomal aberrations and compare with the tumors of origin[1], • To determine the minimum effective dosage of the proposed modulator (s) in combination with vinblastine in tumor bearing mice[1], • To determine the concentration of modulator in the neoplastic tissues and to examine the effect of modulator on the antitumor activity of vinblastine in resistant tumor bearing mice[1].	21.75	19.15
18.	Transgenic mouse models for studying lamin gene function, regulation and aberrant expression.	• To use transgenic mouse models to study the regulation of the tissue specific expression of the lamin A gene & the temporal pattern of the expression of the lamin A during embryonic development[2], • To determine whether mutations in the lamin A gene can lead to an animal model for human diseases[2], • To examine the functional importance of lamin A expression when a B-Type lamina appears to suffice in early embryonic stages, using a gene knock out mouse model[2].	37.26	35.78
19.	Breeding for inter- specific and inter generic hybrids of orchids for Commercial cultivation	• Production of novel hybrids with expert potential through intraspecific, interspecific and intergenere crosses among sympodial and monopodial orchid varieties[2].	19.84	18.52

Sl. No.	Name of the Project	Objectives	Sanctioned Cost	Release
20.	Triploid production in watermelon and annonas through *in vitro* endosperm culture	• Standardization of culture conditions for shoot multiplication and rooting[1], • Standardization of protocol of *in vitro* endosperm culture for the production of triploid plantlets[1], • Development of somatic embryogenesis which would be utilized for true-to-type synthetic seed technology and genetic transformation system[1], • Induction of organogenesis from triploid callus cultures[1].	9.58	9.55
21.	Investigations on somatic embyogenesis and plant regeneration in temperate Morus species	• Develop methods for high frequency somatic embryogenesis and plant regeneration in temperate Morus species[1], • Determine an efficient acclimatization method for regenerated plants, and[1] • Evaluate field performance of the regenerated plants[1].	11.36	9.71
22.	In-vitro technology for micro-propagation and selection of salt tolerant cell lines of heitera and Nypa of Sundarban	Original Objectives: • To identify and establish the ideal explants for in vitro cultivation[2], • To standardize the protocol for suspension culture and induction of somaclonal variation for salt tolerance[2], • To screen for tolerance at different regimes of salinity and the influence of different salts on embryogenesis and regeneration[1], • To study physiological parameters of the selected cell zones contributing to salt tolerance/avoidance[1], • To study the cytological, anatomical and histochemical properties for organigenesis/embryogenesis during process of dedifferentiation and redifferentiation[1], • To standardize protocol for multiple bud/shoot formation and its subsequent multiplication and establishment[2], • To study the fungal/bacterial interaction in having an axenic plant parts (axillary/apical buds) and their maintenance under in vitro system[1].	14.80	15.38

Sl. No.	Name of the Project	Objectives	Sanctioned Cost	Release
		Revised objectives: • To identify and establish the ideal explants for *in vitro* cultivation[2], • To standardize the protocol for suspension culture and induction of variations for salt tolerance[2], • To standardize protocol for micropropagation following multiple bud formation with an efficient rooting system[2].		
23.	Development of An Embryogenic system for genetic improvement and mass propagation of *Pinus kesiya*	• Determination of the factors for large-scale production of somatic embryos and their conversion to plants[2], • Demonstration trial of at least one thousand somatic embryo derived plants[2], • Development of a complete reproducible protocol for mass multiplication[2], • Construction of Growth Room was essential for successful completion of project[1].	40.69	42.44
24.	Micro-propagation and Genetic transformation of Ornamental species of Dianthus	• To develop suitable protocol for genetic transformation of Dianthus through *Agrabacterium tumefaciens* mediate transfer of reporter gus and other marker gene for selection of transformed tissues and to regenerate transgenic plants[2], • To transfer the genes related to control of flower colour development and to regenerate the transgenic plants[2].	9.88	11.67
25.	Development of individual cell electroporator and standardization of cell porator protocol	• Fabrication and alpha testing of an electroporation instrument using a new design (IIT, Bombay-IITB), flow cell (SAMEER) ad transducers (IITB)[2], • Beta-testing and modification of the instrument as necessary[2], • Standardization of the equipment for cell poration by actual cell runs using any one cell type (Cancer Research Institute, CRI and IITB)[2], • Experimentation on electroporating other cell lines and development of electroporation protocols (CRI&IITB)[2].	24.40	19.90

Sl. No.	Name of the Project	Objectives	Sanctioned Cost	Release
26.	Re-combinant expression of transforming growth factor-B.	• Construction and expression of vectors to produce human TGF-B isoforms in mammalian cell lines[2], • Amplification and selection of the best expression system, • Development of immuno and bio-assays for TGF-Bs to monitor and analyse the recombinant expression and for ascertaining biological activity[2], • Purification of recombinant TGF-Bs[2], • Testing of r TGF-Bs for their immunological and biological activities[2].	20.63	16.67
27.	Metabolic regulation in *streptomyces sp.* in relation to Biosynthesis of beta-lactam antibiotics	• To investigate the role of various metabolites in expression and regulation of clavulanic acid and cephalosporin key enzymes in Streptomyces clavuligerus and to optimize the parameters for dissociation and better production of clavulanic acid amd cephalosporin[2], • To study the activity and productivity of immobilized cells of *Streptomyces clavuligerus*, select the appropriate immobilization media, optimise the immobilization technique, compare the productivity with that of free cell system and develop appropriate kinetic model for production of clavulanic acid and cephalosporin.	16.35	13.97
28.	Microbial production of biodegradable plastics	• Screening of various microorganisms for their potential to produce PHAs from a variety of renewable substrates, • Isolation of hyper strain(s) for the production of high yielding PHAs by utilizing genetic and biochemical manipulations of regulatory mechanisms for ezymes involved in the biosynthesis and regulation of PHAs using carbon sources other than glucose[2], • Optimise fermentation parameters for better yield of PHAs and standardise isolation procedures from bacterial biomass[2], • Production of PHAs with known monomer units and making tailor made polyesters by mixing various amounts of PHAs and petroleum plastics and studying their stability under the natural habitats[2], • Preparation of final reports etc. and making techno economic feasibility report for the production of PHAs[2].	12.06	11.40

Sl. No.	Name of the Project	Objectives	Sanctioned Cost	Release
29.	Development and Transfer of process Know-how for mosquito and household pests repellents / herbal formulations for women welfare	• To develop improved process know how for various anti-mosquito/anti-pests formulations using medicinal and aromatic plant materials[2], • To train the women in making these formulations, • To transfer the process know how to the interested women entrepreneurs[1].	24.08	19.08
30.	Training women population in traditional and Biotechnological approaches for food processing and preservation	• To improve nutritional quality of foods-both traditional and some modern biotechnological processes and to develop methods for retention of nutritive value of these products[2].	8.90	6.83
31.	Development of diagnostic kits for the assay of certain Toxic elements and pesticide residues in milk.	Immediate objectives: • Development of kit for heavy Metals (Lead and Cadmium)[1], • Development of kit for pesticides (DDT & BHC), Long-term objectives: • Kits developed in this scheme will be used for field studies[1], • Starting an Environmental Division at the Institute of Food and Dairy Technology, Koduvali for analysing heavy metals and pesticides in milk and milk products[1].	8.30	8.63
32.	Development and Standardization of Biodetector kit for identification of pesticides and biological toxins in the environment.	• Diagnostic biotechnology leading to development and standardization of biodetector and dispstick methods[2], • Optimization of methodology, fabrication and development of portable biodetector kit for filed detection and identification of select hazardous chemical toxicants[2], • Production of bacterial, algal and fungal toxin specific polyclonal antibodies for use in immunodiagnostic methods leading to development of diagnostic kits[2].	41.00	39.96
33.	Process scale up and Engineering studies for obtaining purified phosphatidyl choline from Soylecithin.	• Improvement in product quality by super-critical extraction column chromatography, product refining and polishing the product by selection of different separation techniques and stabilisation of the product by addition of pherol[2], • Examination of thermo physical parameters like density, specific heat, viscosity, thermal	20.05	20.73

Sl. No.	Name of the Project	Objectives	Sanctioned Cost	Release
		conductivity of materials at the various stages of processing calorimetric studies[2], • Scale-up of the lab level process of enrichment of lecithin by ethanol extraction[2].		
34.	Application of thermophilic micro-organisms for improved leaching of Copper from low and lean grade ores of Indian mines and from floatation concentrates.	• Development of efficient bio-hydrometallurgical methods for leaching of copper from unutilised recalcitrant sulfidic ore deposits of Indian mines[2], • Utilisation of thermophilic microbes after their isolation, characterisation and ascertaining of bioleaching properties for objective[2].	6.98	7.16
		Grand Total	**687.90**	**609.78**

ANNEXURE 3

Lapses in Project Management

(Rupees in lakh)

S.N.	Name of Project	Sanctioned Cost	Release
Annual Review not done			
1.	Studies on catabolic assimilatory capacity and population dynamics of hydro carbon remediating effluent treatment plant	19.98	7.91
2.	Bacterial Diversity in Soil: Generation of Microbial Inocula for Clean-up of Contaminated Sites	21.90	23.10
3.	Identification of efficiently nodulating and nitrogen fixing strains of bradyrhizobium in Gujarat and their application	11.63	9.79
4.	Mud crab hatchery technology and crablet production	14.10	9.57
5.	Technology development for spiny lobster *Panulirus homarus* larval rearing	12.00	7.26
6.	Biological control of stem rot diseases of berseem (*Terifolium alexandrinum*) with Trichoderma	6.67	1.10
7.	Kairomone mediated management of *Heliocoverpa armigera* (HUB)	10.97	5.15
8.	Use of Semio-chemicals to biocontrol potentials of some important predators and parasidoids	45.90	26.52
9.	Mass production of Phytoseiid mite predators for biological control of spider mites	19.13	18.29
10.	Floriculture: A source of self employment and income generation for SC/ST rural youth	10.07	4.72
11.	Molecular typing of HIV type I strains circulating in India	83.93	68.94
12.	Distribution Information Centre (DIC)	72.40	37.18
13.	Immunological and Virological studies in Human Immunodeficiency Virus (HIV) infection	40.21	39.13
14.	Transfer of salt tolerance to the timber yielding forest tree legume species of dalbergia via inter specific protoplast fusion with a mangrove associate *D. SPINOSA*	31.37	35.09
15.	In–vitro and in-vivo techniques for rapid multiplication of seed potato.	16.79	17.64
16.	Micropropagation system for Garcinia	14.02	6.68
17.	Development of micro-enterprises among rural women through vermiculture in South Tripura	5.18	4.32
	Total	**436.25**	**322.39**
Action not taken on the recommendation of Task Force			
18.	Evolution of promising probiotics for economical raising of dairy calves	10.00	8.41

S.N.	Name of Project	Sanctioned Cost	Release
19.	Fish brood stock improvement by genetic engineering	18.82	15.79
20.	Evaluation of Indian Horseshoe crab for presence of antifouling compounds	16.02	14.91
21.	Production of seed and pearls of Blacklip pearl oyster Pinctada margaritifera in on shore tanks	7.59	4.53
22.	Development of phosphatase producing bacterial biofertilisers for aquaculture	9.55	8.35
23.	Development of microorganisms for removal of colour from treated distillery effluent	10.66	8.81
24.	Eco-technology for treating dye waste water of textile industries : A demonstration project	7.66	7.11
25.	Establishment of Production Unit for development, production and demonstration of biocontrol agents under IPM in the Mission Mode Program	10.30	9.24
26.	Designing drugs for evaluation of Renal Functional Disorder	26.92	19.57
27.	Developing protocols for micro propagation and genetics transformation for improvement of *Terminalia tomentosa*	14.14	16.39
28.	Melberry improvement through somatic fusion	16.37	16.33
29.	Isolation of somaclones and root rot disease resistant varieties in Ginger	9.70	7.86
	Total	**157.73**	**137.30**
Project Completion Report & Consolidated Utilisation Certificate not received			
30.	Conservation of Biodiversity: Biotechnological approaches in characterization of mangrove microbial eco-system in Bay Islands.	28.34	23.87
31.	Establishment of a production unit for development and demonstration of biocontrol agents for fruits & vegetables	20.04	15.75
32.	Biological Control of Agrotis spp. with entornophilic nematodes	37.71	36.37
33.	Development of Insect Growth Regulators from Natural Products of Medicinal and Aromatic Plants	8.41	8.41
34.	Kairomones in the integrated management of yellow stern borer and plant hoppers in rice and spotted boll worm on cotton	30.59	14.36
35.	Biological Control of Key Pests of Pulse and Oilseeds through Biotechnological Approaches	12.12	12.06
36.	Establishment of production unit for the Development, Production and Demonstration of Biological Control Agents under Integrated Pest Management (IPM)	15.35	9.56
37.	Establishment of production unit for the Development, Production and Demonstration of Biological Control Agents under IPM	11.65	11.56
38.	Development, Production and Demonstration of Biological Control Agents under IPM, Regional Agricultural Research Station, LAM, Guntur, A.P.	21.66	10.42
39.	Development, Production and Demonstration of Biological Control Agents under IPM, Central Tobacco Research Institute, Rajahmundry	20.71	20.49

S.N.	Name of Project	Sanctioned Cost	Release
40.	Development, Production and Demonstration of Biological Control Agents under IPM, Gujarat Agriculture University (GAU), Anand	23.66	16.85
41.	Development, Production and Demonstration of Biological Control Agents under IPM, Department of Agricultural Entomology, PDVR, Gandhi Nagar, Sunderpur, Varanasi	32.37	29.60
42.	Development, Production and Demonstration of Biological Control Agents under IPM, Agricultural Research Station, Sriganganagar, Rajasthan	30.95	25.90
43.	Development, Production and Demonstration of Biological Control Agents under IPM, Regional Research Laboratory (RRL), Jammu	33.75	30.23
44.	Biopesticides for integrated management of pests and diseases of Tea in North Eastern India	13.80	9.78
45.	Technology transfer in biological pest control in major crops for the upliftment of SC/ST population	14.54	6.40
46.	Tolerance mechanism for Crop Improvement in Drought and Thermal Stress Environment	11.13	11.51
47.	Development of insect resistant transgenic plants by introduction of a modified endotoxin gene of Bacillus Thuringiensis	25.97	22.36
48.	Development of Transgenic Plants Producing Edible Vaccine against Rabies Virus	12.67	12.47
49.	Evaluation of PCR based test for Tuberculosis	10.71	9.16
50.	A Non-replicating oral vaccine against Cholera: Protective antigens encapsulated in biodegradable microspheres	14.32	12.85
51.	Distribution, Habitat, Protocol Development & Economic Potential of Seabuckthorn (Hippophae L.) in Sikkim	20.04	11.84
52.	Development of recombinant Sendai Virus for the large scale production of Biologically active proteins of Therapeutic importance	48.06	48.06
53.	Sustainable Development through Aquaculture practices of small and endangeredfishes for ecomic development of SC/ST population, East Singhbhum district of Bihar	9.55	5.76
	Total	**508.10**	**415.62**
Project Completion Report received but yet to be evaluated			
54.	Characterization of the delta Opioid receptor	27.55	23.26
55.	Construction of agriculturally important Azotobacter strains that are highly efficient in nitrogen fixation	31.79	33.32
56.	Demonstration of integrated organic farming - organo biofertiliser package using vermicomposting and VAM fungi in Aromatic plants namely Cymbopogon winterianus, C. martinii & Polianthes tuberosa.	19.45	14.37
57.	Studies on the Anoxygenic purple non-sulfur bacteria of paddy soils of Andhra Pradesh: their contribution to nitrogen fixation and possible exploitation as biofertiliser	25.11	24.72
58.	Production and demonstration of Biocontrol agents in integrated pest management systems	14.42	12.82

S.N.	Name of Project	Sanctioned Cost	Release
59.	Training-cum-production centre for SC/ST population only, in cultivation, distillation and fractionation of aromatic and medicinal plants	29.98	26.97
	Total	**148.30**	**135.46**
Project Terminated Midway			
60.	Bio-Conversion of agro/forest produce into useful products in backward region of Vidarbha (Maharashtra)	20.39	14.45
61.	Characterisation of an Antioxidant peptide "Turmerin" from Turmeric	15.95	10.90
62.	Studies on structure-function relationship of psophocarpin B. a chymotrypsin, inhibitor: a programme of initiation of protein engineering	71.71	70.11
63.	Assay of meat borne hazards- toxic residues.	39.15	34.81
64.	Conservation and utilization of indigenous variability in horticultural and plants of economic importance of Bihar	165.56	5.00
65.	Development of ELISA kit for measuring protactin in Human Serum	9.45	7.20
66.	Monoclonal antibody based antigen detection test for Kala Azar	NA	NA
67.	*In vitro* studies on micro propagation of mango	15.09	3.26
68.	Rose cultivation, its products and Marketing: A demonstration project for Women and Rural development in Bidar District, Karnataka	14.70	3.33
69.	Training women in cultivation of Agaricus (Button Mushroom) in Gulbarga	3.03	1.01
	Total	**355.03**	**150.07**
Project Investigator (PI) Left Midway			
70.	Study of the feasibility of diagnostic kit based on dengue virus-induced cytotoxic factor	41.71	27.50
71.	Studies on the expression of cutaneous nitric oxide synthase in developing mice and its role in the skin tumour development	24.14	15.09
72.	Crystallisation and crystal structure analysis of the ternary complex of a bifunctional protein inhibitor PK 13 with the enzymes proteinase K and alpha-amylase	54.13	41.56
73.	Production of Urokinase using Mammalian cell culture in Perfusion Bioreactor with in situ product separation	38.52	32.49
74.	Microbial synthesis of Inulinases	18.48	16.91
75.	Characterization of plasmid mediated-chromium resistance in bacteria for microbial recovery of chromium from tannery effluents	21.15	19.11
	Total	**198.13**	**152.66**
Overlapping Projects Sanctioned			
76.	Programme support of Biofertilizer technology development and demonstration in backward region of Vidarbha	35.09	41.98
77.	Development of efficient mass production, release and population management technologies for the egg Parasitoids, Trichogramma spp.	13.63	15.45

S.N.	Name of Project	Sanctioned Cost	Release
78.	Centre for Molecular Genetics for the diagnosis of Haematological disorders	169.72	126.44
79.	To establish Genetic Clinic, Diagnostic Laboratory and Counselling for Genetic Diseases in Western India	28.76	28.76
80.	Development of indigenous ELISA, LA and DAT Kit for diagnosis of Toxoplasmosis	12.81	13.21
	Total	**260.01**	**225.84**
	Grand Total	**2063.55**	**1539.34**

ANNEXURE 4

Non Transfer of technology

(Rupees in lakh)

Sl. No.	Name of the Project	Sanctioned Cost	Expenditure
1.	Production & Clinical trial of EPA on patients suffering from atherosclerotic and thronotics heart diseases	13.48	13.12
2.	Development of feed technology for semi-intensive/intensive prawn Farming	19.32	16.55
3.	Studies on the development of technology for mud crab larval hatchery	17.51	18.37
4.	Development of Immunodiagnostic kits for Bacterial diseases of fishes	16.58	16.01
5.	Study on Synergism with Molluscicides of plants against harmful snails	7.42	7.74
6.	National Centre for Freshwater Pearl Culture	11.39	8.31
7.	Carp Seed Production, in a controlled environment system for developing aquaplosion serving as a subsidy to the stressed eco-system in Western Rajasthan	8.57	9.84
8.	Development of the Rapid Diagnostic tests against Japanese Encephlaitis Virus	32.45	37.63
9.	Development of Liposome Technology for the extended ocular drug delivery	22.67	23.86
10.	Isolation, Characterization and mechanism of action of an active principle from Neem (Azadirachta Indica) bark extract for controlling gastic hyperacidity and ulceration	17.25	19.86
11.	Process optimisation for a thermostable lipase from Aspergillus terreus	34.62	4460
12.	Biotechnological development of shelf stable probiotic cultures containing dairy foods	28.24	22.77
13.	Development of Processes for flavours and food additives using whole microbial cells/enzymes	22.49	17.46
14.	Large Scale production of Betalains by hairy root cultures of BETA VULGARIS	19.68	19.69
15.	Production and characterisation of intermediate thermostable (ITS) - amylase for enzyme modified bread (EMB) technology	16.57	17.40
16.	Large scale production of conessine by plant cell culture of *Holarrhena antidysenterica.*	16.19	16.12
17.	Production of Thermostable Proteases and Lipases from Thermophiles	14.80	12.98
18.	Alkaline protease: Process Development and Demonstration of its Application in Leather Industry	40.24	28.56
	Grand Total	**359.47**	**350.87**

CHAPTER 4 : COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

4.1 Avoidable loss of Rs 64.93 lakh

Injudicious decision to obtain power supply on a single point resulted in avoidable loss of Rs 64.93 lakh.

The Council of Scientific and Industrial Research (CSIR), an autonomous body under the Department of Scientific and Industrial Research, owns two multi-storyed buildings called "Maharani Bagh Scientist Apartments" since 1987 which were constructed in two phases. CSIR obtained a sanctioned load of 590.9 KW for Phase I from Delhi Vidyut Board (DVB) in June 1988 at single point supply. CSIR itself managed the distribution from the sub-station. Since the campus comprised of scientist's apartments, guest house, pumping stations, lifts etc., DVB charged non-domestic rates for the energy consumed. CSIR, however, recovered the electricity charges only on the basis of the prevalent domestic tariff from the occupants of the apartments resulting in substantial losses on account of the difference between the domestic and non-domestic tariffs.

CSIR applied for additional load of 578.10 KW for Phase II in March 1989. However, while processing the case for the additional load in April 1992, CSIR also assessed the financial implications of obtaining single point supply in Phase I as it had been incurring additional expenditure of Rs 0.25 lakh per month for the occupants by that time. CSIR, therefore, requested DVB in July 1992 to provide individual meters in the apartments constructed in Phase II. In July 1993, CSIR again requested DVB to terminate the existing contract and to sanction individual connections to all residential apartments of Phases I and II on domestic tariff and sanction a common load of 181.6 KW for both Phases for pumping stations, lifts and street lights on HT tariff from their system. CSIR also offered the use of its substation equipment to DVB free of cost for the purpose. DVB submitted an estimate of Rs 6 lakh in December 1994 out of which the share of CSIR was Rs 5.60 lakh for the electrification of the campus. The work was to be taken up by DVB on handing over of sub-station. CSIR deposited Rs 5.60 lakh with DVB in April 1995, but it did not hand over the sub-station to DVB. Between April 1995 and April 1998, no decision was taken in CSIR on handing over the sub-station to DVB. Director General, CSIR, in April 1998, constituted a committee to examine the matter, which in January 2001 recommended the handing over of the sub-station to

DVB and obtaining individual connections. Thus, it took over five years for CSIR to take a decision on the handing over of sub-station to DVB. The sub-station was yet to be handed over as of September 2002. Meanwhile, CSIR continued to pay on the basis of non-domestic tariff to DVB. CSIR paid Rs 308.30 lakh between June 1988 and March 2002 as electricity charges for Maharani Bagh Scientist Apartments, which included energy consumed by the occupants as well as for the maintenance of guesthouse and common facilities. From the information made available to Audit for the period October 1993 to March 2002, it was observed that as against the total payment of Rs 103.10 lakh to DVB for energy consumed by the occupants, the corresponding recovery was only Rs 28.78 lakh resulting in an additional expenditure of Rs 74.32 lakh by CSIR from its own resources. Of this, Rs 64.93 lakh incurred during May 1995 to March 2002 could have been largely avoided, had CSIR taken prompt action to handover the sub-station.

Thus, injudicious decision of taking single point bulk supply of power, failure to obtain separate connections for the scientist's apartments initially and delay in taking a decision on handing over of the sub-station to DVB, led to an avoidable loss of Rs 64.93 lakh to CSIR during May 1995 to March 2002. Further loss on this account will continue to be incurred till such time the sub-station is handed over and individual connections activated.

The matter was referred to the Council in June 2002, who have not replied as of January 2003.

4.2 Unfruitful expenditure

A safety system developed at a cost of Rs 25.77 lakh for the protection of underground mining equipment was not commercially utilized even after the lapse of more than twelve years.

The Central Mining Research Institute (CMRI), Dhanbad, undertook a project in June 1985 called "Development of sensors and microprocessor-based switching system for intrinsically safe power supply for underground use" at a cost of Rs 23.50 lakh provided by the Department of Coal, Ministry of Steel, Mines & Coal, with the targeted date of completion as June 1988. The project proposal envisaged the development of a safety system for protection of underground mining equipment from breakdown by monitoring the mine's environmental parameters viz. methane gas, air velocity, carbon monoxide, temperature and air pressure and condition of mining machinery through six sensors. The project proposal also envisaged an increase of mining production

of over Rs 20 crore and import substitution of over Rs 20 crore annually in addition to improving safety by reducing breakdown time of mining machinery. The project proposal also stipulated release of the know-how to manufacturers for production. The project was completed in March 1990 i.e. 21 months after the targeted date of completion. Only four sensors for monitoring methane, air velocity, temperature and condition of machinery could be developed at a total cost of Rs 25.77 lakh.

Subsequently the Ministry of Coal in September 1996 sanctioned another related project called "Field trial of Data Acquisition system" at a cost of Rs 7.10 lakh. The objective was to fabricate a Data Acquisition system comprising of six sensors and to install the system in a Colliery for conducting field trials for a one-year period, to be completed within three years. The Institute was to ensure commercialization of the technology developed. In February 1997, Rs 6.55 lakh was released to CMRI for execution of the project. The system developed could, however, monitor only methane, air velocity, temperature and the status of mining machinery. The Institute conducted a trial run of the system without carbon monoxide and air pressure sensors for one year in two spells from September 1999 to January 2000 and again from September 2000 to March 2001 in Bararee colliery of Bharat Coking Coal Limited (BCCL). It closed the project (March 2001) after incurring an expenditure of Rs 4.63 lakh. However, BCCL had found only the performance of the methane sensor satisfactory in the first spell of the field trial. Subsequently, in April 2001, BCCL informed the Institute that the computer in the system needed to be set right and that the field trial be continued for another month. The Institute did not, however, take any action on the grounds that the project had already been closed.

Even though the entire system with six sensors was yet to be successfully developed and tested, the Institute commissioned a private firm in September 2001 to ascertain the market potential of the product. The survey had not been completed as of October 2002.

CMRI stated in May 2002 that the system had been installed in Bararee Colliery of BCCL and that it had been functioning successfully. The contention of CMRI was not tenable since BCCL had already pointed out that even the truncated system with four sensors was not functioning satisfactorily.

Thus, even after the lapse of more than twelve years and after incurring an expenditure of Rs 30.40 lakh, the Institute could not develop the envisaged system comprising six sensors for protection of underground mining equipment. While the Institute commissioned a market survey to assess the market potential of the system, it is difficult to appreciate as to how the

technology was sought to be commercialized when the system was yet to be developed successfully on the lines envisaged.

The matter was referred to the Council in June 2002, who have not replied as of January 2003.

4.3 Irregularity in transfer and commercialization of technology leading to non receipt of technology fee

IIP entered into an agreement with M/s Tria Fine Chem and later with M/s Pushkar Chem for commercialization of two technologies developed by it. IIP failed to recover its dues from the company even while handing over the basic engineering package to the company.

The Indian Institute of Petroleum (IIP) developed process technologies for production of two Butylated Phenol based antioxidants in a project sponsored by a private company, M/s AEC. In May 1995, IIP and AEC entered into an agreement for commercialization of these technologies with M/s Tria Fine Chem. A licence fee of Rs 35.00 lakh and a design fee of Rs 17.50 lakh was to be paid by M/s Tria Fine Chem in different stages as outlined in the agreement. While the licence fee was to be shared between IIP and AEC in the ratio 20: 80, the entire design fee was to be paid to IIP. Royalty at the rate of three *per cent* was also to be paid by M/s Tria Fine Chem, divisible equally between IIP and AEC.

With the signing of the agreement, the first instalment of licence fee amounting to Rs 8.75 lakh was received. Thereafter, the process was to be demonstrated at IIP, which was to be done within four months. However, this could not be done even over the next three years since M/s Tria Fine Chem did not display any interest. In July 1998, after a lapse of three years, the company expressed its inability to arrange for the demonstration owing to adverse money market conditions.

Meanwhile in January 1998, M/s Tria Fine Chem had approached the Technology Development Board (TDB) for a loan in order to commercialize these technologies. TDB, after evaluation of the proposal of the company, desired that a separate company be formed to execute the project and that a fresh agreement be concluded between IIP and the new company. Accordingly in September 1998, a new company named M/s Pushkar Chem was formed. At the instance of M/s Tria Fine Chem, IIP and AEC entered into a new agreement with M/s Pushkar Chem in December 1998, through which all liabilities and rights regarding technology for production of the two anti-

oxidants developed by IIP were transferred from M/s Tria Fine Chem to M/s Pushkar Chem. IIP had undertaken to discharge the commitments of the agreement with respect to AEC whose address was not known. The payment of the balance amount of Rs 26.25 lakh towards licence fee and Rs 17.50 lakh towards design fee were rescheduled in the following stages.

Licence Fee

- Rs 8.75 within ten days of the demonstration of the process on lab scale;
- Rs 8.75 lakh within ten days of the submission of Basic Engineering Package (BEP); and
- Rs 8.75 lakh within 10 days of the successful commissioning of the plant.

Design Fee

- Rs 50,000 on signing the agreement;
- Rs 4.50 lakh within ten days of receiving the loan from TDB;
- Rs 10.00 lakh on submission of BEP; and
- Rs 2.50 lakh after meeting the guarantees on the commercial plant of 100 tonnes per annum.

On signing the agreement on 28 December 1998, IIP was to receive Rs 50,000 towards design fee but this was paid only in January 2000. Similarly, in terms of the agreement, Rs 4.50 lakh was to be paid towards design fee within ten days of M/s Pushkar Chem receiving the loan assistance from TDB. While TDB released the first instalment of the loan in June 1999, M/s Pushkar Chem paid Rs 4.50 lakh to IIP only in April 2000 through two separate cheques. Simultaneously, IIP handed over the Basic Engineering Package to M/s Pushkar Chem. It was also agreed that M/s Pushkar Chem would pay Rs 10 lakh, as part of the design fee for the BEP by May-June, 2000. However, no mention was made of the licence fee of Rs 8.75 lakh that became payable by the company on the handing over of the BEP as per the agreement, as well as making arrangement for demonstration of the process technologies since another instalment of Rs 8.75 lakh was required to be paid within ten days of the demonstration. Subsequently, the bank dishonored the cheques received by IIP in April 2000.

As of November 2002, IIP had not initiated any legal action against the company with reference to the dishonored cheques amounting to Rs 4.50 lakh. The company has not paid Rs 18.75 lakh (Rs 10 lakh towards design fee and Rs 8.75 lakh towards licence fee) to IIP for the Basic Engineering Package. The demonstration of the process technologies has also not taken place. IIP

failed to protect its own interests in the transfer of technology agreement. There is also no prospect of recovery of the amounts due from the company as per the terms of the agreement.

The matter was referred to the Council in September 2002, who have not replied as of January 2003.

CHAPTER 5 : DEPARTMENT OF SCIENCE AND TECHNOLOGY

Indian Association for the Cultivation of Science

5.1 Unfruitful investment on procurement of Liquid Nitrogen Plant

Procurement and acceptance of a Liquid Nitrogen Plant by the Indian Association for the Cultivation of Science not conforming to stipulated specifications and failure to insist on its replacement after proper inspection and tests resulted in investments aggregating to Rs 65 lakh being rendered unfruitful for over two years and in the Association's research activities being hampered.

The Indian Association for the Cultivation of Science, Kolkata, a society registered under the Societies Registration Act, 1860, and under the administrative control of the Department of Science and Technology, placed an order on a foreign firm based in the United States of America in February 1998 for the supply and installation of a Liquid Nitrogen Plant with a storage tank and consumable spares for one year's operation at a cost of Rs 59.05 lakh. The plant was to have the capacity to produce 15 litres of Liquid Nitrogen per hour and was intended to enhance the capacity for its production for supporting the cryogen-based activities of the Association and other institutes funded by Government.

The foreign supplier shipped the consignment in July 1998; the Association received the consignment in August 1998. The plant was covered by warranty for a period of 12 months from the date of installation and commissioning or 15 months from the date of shipment, whichever was earlier.

Attempts made by the supplier's Indian agent in October 1998 to install the plant were unsuccessful because of the failure of one of its components (turbo expander). A replacement of the turbo expander provided free of cost by the Indian agent also failed necessitating the provision of another turbo expander, also free of cost. Though the plant was installed and commissioned thereafter in April 1999, the hourly production of Liquid Nitrogen was found to be only 10 litres as against 15 litres guaranteed by the supplier. Further, on account of certain technical defects, the plant also functioned only intermittently. Nevertheless, the official in-charge of the plant had certified in June 1999 that the Indian agent had satisfactorily installed the plant based on which the

Association did not insist on replacement of the plant within its warranty period, which expired in September 1999.

Since the performance of the plant continued to be unsatisfactory, the Association procured, at the instance of the Indian agent, a new turbo expander in September 2000 at a cost of Rs 5.95 lakh. However, this also failed to yield satisfactory results and the plant ceased functioning in December 2000. In order to resolve the problem, the foreign supplier agreed in July 2001 to inspect and test the plant at their works. The Governing Council of the Association, however, decided in October 2001 not to accept this offer in view of the risks involved in sending back the entire plant to the United States. The nature of these risks was, however, not spelt out. Further, the Council also decided not to recommend any legal action in this regard on the ground that the Association was not likely to gain anything in the process or to constitute a committee to investigate the matter. Instead, the Director of the Association was empowered to consult cryogenic experts and to authorize dismantling of the plant to make it functional.

While the plant had not been re-commissioned as of March 2002, the Association stated (April 2002) that the matter had been discussed by the Finance Committee and the Council and that it had been resolved in March 2002 to empower the President to constitute a high power committee consisting of technical and financial experts to look into the matter from the technical, procedural and legal points of view and to submit its recommendations to the Council. The Association added that remedial measures to be taken were also being examined separately.

Considering the fact that the performance of the plant was unsatisfactory ever since its commissioning and that the stipulated specifications had obviously not been adhered to by the foreign supplier, the decision not to insist on its replacement after proper inspection and tests would not appear to have been prudent and in the financial interests of the Association. Apart from the investments aggregating to Rs 65 lakh being rendered unfruitful in the process for over two years, the research activities of the Association had also admittedly been hampered. Besides, additional requirements of Liquid Nitrogen also had to be met by procurement from outside sources involving avoidable additional expenditure, details of which were not readily ascertainable.

The matter was referred to the Department in August 2002. While their reply was awaited, the Association informed Audit (October 2002) that the meetings of the Finance Committee and the Council had just been held and that a reply

to the audit observations would be furnished immediately after finalisation of the minutes of these meetings.

5.2 Improper planning leading to idling of funds

Failure of SOICC to re-assess the requirement of space in view of the decision taken to convert staff quarters into office premises and delay in communicating their decision to CPWD resulted in blockage of Rs 115.60 lakh since June 1996.

The Survey of India, Central Circle, Jabalpur (SOICC) was housed in hired premises and it took on lease 83,908 square feet of land at a cost of Rs 16.78 lakh in September 1986 from the Town and Country Development Authority, Jabalpur for the construction of an office building. On the request of SOICC in June 1988, the Central Public Works Department (CPWD), Jabalpur, submitted rough cost estimates amounting to Rs 374.27 lakh for a nine-storey structure in November 1988. Pending finalization of the construction plan and based on the rough cost estimate, the Department of Science and Technology accorded administrative approval in August 1989 and expenditure sanction for the year 1990-91 in October 1989. However, construction could not commence since a 'no objection' certificate was not issued by the local authorities. The Town and Country Development Authority finally approved the plan for construction of only a seven-storey building in July 1993. CPWD, thereafter, invited tenders in October 1994.

Meanwhile, SOICC sought the approval of the Surveyor General of India in May 1994 to utilize surplus residential staff quarters to locate offices which were operating from hired premises. SOICC modified 91 Type III staff quarters for the purpose of housing its offices after receiving the Surveyor General's approval in January 1995. SOICC, in July 1995 initiated the process of shifting its offices to the modified residential quarters.

In the mean time, the earlier expenditure sanction expired in March 1995, as the construction had not commenced within five years of issue of sanction. However, SOICC did not communicate this to CPWD, which commenced construction in April 1995.

Despite the fact that the expenditure sanction had expired and 91 staff quarters had already been modified for accommodating its offices, SOICC did not re-assess its space requirements and CPWD continued the construction work incurring expenditure out of the funds already allotted for the purpose. It was

only in May 1996 that SOICC instructed CPWD to stop the construction. CPWD stopped the work in June 1996 by which time expenditure of Rs 115.60 lakh had already been incurred on construction of foundation and pillars.

Since the staff quarters had been modified for accommodating offices and there would be little requirement of office space in future, SOICC in May 2001 decided, in consultation with CPWD, to reduce the height of the structure to four storeys instead of seven storeys. CPWD in May 2001 submitted a revised estimate for Rs 556.08 lakh for obtaining fresh administrative approval and expenditure sanction. Though the estimates were forwarded to the competent authority in November 2001, the approval had not been accorded as of October 2002.

SOICC stated in September 2002 that all but one of its offices in Jabalpur had shifted to the modified staff quarters. The office located in hired premises was paying rent of Rs 0.13 lakh per month. All key activities would be shifted to the new four-storey complex when completed.

It is apparent that SOICC failed to manage this construction project properly. It separately considered a proposal to modify residential quarters for office use and failed to re-assess the requirement of space and inform CPWD soon after it received approval from the Surveyor General. This resulted in the blocking of funds to the extent of Rs 115.60 lakh since June 1996. It is also not clear as to whether the proposed four-storey building is adequately justified since all but one of its offices are already functioning from the modified staff quarters.

The matter was referred to the Ministry in June 2002, who have not replied as of January 2003.

5.3 Avoidable expenditure on electricity

SOICC, Jabalpur incurred an avoidable expenditure of Rs 22.45 lakh between October 1993 and November 1999 on unconsumed power apart from payment of low power factor charges of Rs 2.88 lakh.

The Survey of India, Central Circle (SOICC), Jabalpur, constructed 344 staff quarters at Vijayanagar. The Central Public Works Department (CPWD) worked out a load of 997 Kilo Watts (KW) for 344 staff quarters and 89 KW for common utilities like staircases, street lighting, pump set and the proposed community and shopping centres. SOICC entered into an agreement with Madhya Pradesh Electricity Board (MPEB) in September 1992, for a period of

two years, for a contracted demand of 625 KVA. The agreement was deemed to continue after its expiry upon the same terms and conditions for the same period unless terminated by either party.

It was subsequently found that the demand for power was less in view of the fact that all the staff quarters were not occupied. SOICC, after the expiry of the first two years, approached MPEB in November 1994 as per provisions of the agreement for a reduction in the contracted demand from 625 KVA to 250 KVA. It, thereafter, requested MPEB in December 1994 to reduce the contracted demand to 200 KVA instead of 250 KVA. However, MPEB did not reduce the contracted demand as requested for by SOICC and the latter continued to incur avoidable expenditure on unconsumed power. The reasons for MPEB not entertaining the request for reduction of contracted demand were not intimated by SOICC. SOICC did not also intimate the details of the action it could have initiated against MPEB for not honoring the provisions of the agreement. After a lapse of more than four years, it was assessed that there was no possibility of actual demand exceeding 115 KVA in the near future. On SOICC's request in May 1999, MPEB reduced the contracted demand to 115 KVA with effect from December 1999.

Audit scrutiny of the power consumed in the period October 1993 to November 1999 revealed that the maximum demand of SOICC varied between only 49.20 KVA and 174.60 KVA. However, MPEB realized charges for monthly demand, which varied between 344 KVA and 469 KVA resulting in avoidable expenditure of Rs 22.45 lakh on unconsumed power. Power factor charges of Rs 2.88 lakh, were also levied by MPEB for the failure of SOICC to raise the power factor up to 90 *per cent* in 49 out of 74 months.

Thus failure of SOICC to get the contracted demand reduced led to avoidable expenditure of Rs 22.45 lakh between October 1993 and November 1999 on unconsumed power besides payment of low power factor charges of Rs 2.88 lakh.

The matter was referred to the Ministry in September 2002, who have not replied as of January 2003.

CHAPTER 6 : INDIAN COUNCIL OF AGRICULTURAL RESEARCH

6.1 Unfruitful expenditure on prematurely closed projects

The Southern Regional Station of the National Dairy Research Institute, Bangalore (NDRI) fore-closed two in-house research projects without achieving their objectives rendering an expenditure of Rs 55.97 lakh incurred on them unfruitful.

(a) A project envisaging an "Integrated Approach for Optimum Performance of Cattle in Farmers' Herds" was undertaken by the Southern Regional Station of the National Dairy Research Institute, Bangalore in April 1996 at an estimated cost of Rs 60 lakh. Out of the total cost, Rs 43.50 lakh was to be spent on salaries and Rs 16.50 lakh on travel, equipment and consumables. The duration of the project was six years. Its objectives were to evolve an appropriate integrated approach to optimize the performance of dairy and draft animals under intensive and semi-intensive animal production systems and also to design a suitable management information system to help maximize returns from dairy farming. The objectives were sought to be achieved by selection of young animals for rearing as bulls; monitoring their growth and reproduction performance under field conditions; monitoring feeding practices under various farming situations; assessing housing, management and healthcare practices and assessing the draft efficiency of crossbred bullocks.

The project was, however, foreclosed in December 1999 without achieving its objectives after incurring an expenditure of Rs 34.42 lakh (Rs 33.92 lakh on salaries and Rs 0.50 lakh on other items). According to the final report on the project submitted by the Project Leader, the expected progress could not be achieved due to non-availability of transport facilities to conduct surveys in villages, difficulties in procurement of chemicals due to financial constraints, reduction in the number of associates due to retirement and the need to adhere to the stipulation that not more than two projects should be entrusted to an individual scientist.

ICAR stated in August 2002 that in view of the fact that the project was continued for three years and valuable information based on field observations was generated, an in-house review was conducted to weed out irrelevant objectives set three years earlier and that a decision was taken to conclude the

project logically in 1999. These arguments contradict the final report which indicated different reasons for the short closure of the project.

(b) Another project entitled "Strategies for augmenting fertility in buffaloes" commenced in January 1996 at an estimated cost of Rs 54.35 lakh. The duration of the project was six years. It aimed to investigate the influence of biological and bio-chemical modulators on hormonal profiles, utero-ovarian proteins and hormonal receptors and to evaluate the influence of sperm and oocyte stimulants on fertilization and embryo development by invitro studies. After incurring an expenditure of Rs 21.55 lakh, the project was foreclosed in October 1999. Neither were its objectives achieved nor could any final conclusion be drawn from the data generated.

ICAR stated in August 2002 that when the 'one scientist – two projects' norm was introduced in NDRI in 1999, all scientists except the Project Leader (PL) opted out of this project and that the project was terminated due to the death of PL, as no other specialised scientist in the relevant discipline was available. The reply is not tenable as in the initial project proposal submitted, eight scientists of NDRI including the PL were proposed to be associated with the project. Out of them, two were from the same division to which the PL belonged. Moreover, there was nothing on record to show that efforts were made to identify an alternate project leader to continue the project.

Thus the foreclosure of the two projects without achieving their stated objectives resulted in unfruitful expenditure of Rs 55.97 lakh.

6.2 Failure of Revolving Fund Scheme

ICAR sanctioned a loan of Rs 30.53 lakh to the Sugarcane Breeding Institute, Coimbatore, one of its constituent units in September 1997 for undertaking a project "Mass Production of Bio-fertilizers for Sugarcane" which was to be repaid in five annual instalments. The targeted production of the fertilizers could not be met and the Institute could repay only one instalment of Rs 6.11 lakh in July 2000.

The Indian Council of Agricultural Research (ICAR) provides financial assistance to constituent units under its "Revolving Fund Scheme" through creation of a one-time revolving fund to meet specific production needs; namely to produce seedlings and planting material, to manufacture new plant and machinery for crop production, to facilitate value addition of farmers' produce and to generate internal resources for meeting non-plan expenditure.

The Sugarcane Breeding Institute (SBI), Coimbatore, a constituent unit of the Council, submitted a proposal in March 1997 for undertaking a project for "Mass Production of Bio-fertilizers for Sugarcane" under the scheme. The viability of the project was based on the estimated shortage of supply over the demand for bio-fertilizers to the extent of 75 *per cent* in the State of Tamil Nadu. The total requirement of bio-fertilizers in the State was estimated at 1,250 tonnes per annum against which maximum production, even after taking into account future expansion of bio-fertilizers units, was expected to be only 350 tonnes per annum. The scheme was considered economically viable. It envisaged that

- the Institute would annually produce 75 tonnes of bio-fertilizers benefiting 15,000 hectares under sugarcane cultivation;
- Rs 92.4 lakh would be earned during the first five years by their sale; and
- the assistance provided by the Council would be repaid from the revenue earned within a period of five years commencing from the second year.

In September 1997, the Council sanctioned a loan of Rs 30.53 lakh for the project which was to be repaid in five equated annual instalments. The Institute received this amount in January 1998.

Even though the entire amount was advanced, the Institute could commence commercial production of fertilizers only from June 1999 due to avoidable administrative delays of about one and a half years in procuring the necessary equipment viz. fermentors. Only Rs 9.72 lakh was spent during 1997-2000 on procurement of equipment against Rs 20.50 lakh envisaged in the proposal. The low expenditure was due to higher projection of estimated cost as well as curtailment in number of items procured.

Against the targeted production of 75 tonnes per year, the Institute could produce and sell only a total quantity of 36.6 tonnes during the period 1999-2002 which was attributed to low demand and competition in the market. The total revenue earned by sale of fertilizers was only Rs 7.25 lakh while the revenue expenditure was Rs 21.80 lakh. The excess of expenditure over income on revenue account was met from the unspent balance available out of the amount advanced by the Council. Since the Institute could not earn the projected revenue the first instalment of repayment of loan of Rs 6.11 lakh was made in July 2000 from the unspent balance out of funds received from the Council. Further instalments were yet to be repaid.

Accepting the above facts and admitting that the Institute did not conduct a formal feasibility study and market survey, ICAR stated in October 2002 that in recent years many sugar factories and private firms had started their own fertilizer production units and adopted various marketing strategies resulting in a drastic reduction in bio-fertilizer sales of the Institute.

It is evident that the project proposal submitted to the Council was based on a flawed understanding of the market and assessment of demand for bio-fertilizers.

The future of the project is still uncertain and it appears unlikely that the Institute would, in fact, be in a position to repay the balance amount of Rs 24.42 lakh to ICAR.

CHAPTER 7 : DEPARTMENT OF ATOMIC ENERGY

7.1 Improper planning leading to delay in commissioning of equipment

The Directorate of Purchase and Stores of Department of Atomic Energy procured two gas-tight high temperature rotary tubular converters and one multipurpose rotary tubular converter in June 1999 and March 2001 at a total cost of Rs 169.07 lakh. The converters could not be installed/commissioned even after the lapse of more than two to three years of their receipt, as the infrastructure needed for their commissioning was not ready.

(a) The Directorate of Purchase and Stores (DPS), Mumbai of the Department of Atomic Energy (DAE), placed an order on M/s. Precision Controls, Chennai in July 1998 for design, fabrication, supply, installation and commissioning of two Gas-tight High Temperature Rotary Tubular Converters at a cost of Rs 126.95 lakh. This included Rs 2 lakh as installation and commissioning charges payable after satisfactory installation and commissioning of the equipment. These converters were a special type of furnace required for production of intermediate uranium compounds used to produce uranium metal fuel for research reactors at the Bhabha Atomic Research Centre (BARC), Mumbai under the IX Plan project "Production and Processing of Uranium Compounds – Upgradation of Technology".

The terms and conditions of the purchase order *inter-alia* stipulated that in the event of failure of the furnaces to attain specified temperature of 1000° centigrade, the equipment was liable to be rejected. The conditions of the purchase order also stipulated the payment of 15 *per cent* basic cost of the equipment after its satisfactory installation and commissioning.

DPS paid Rs 112.20 lakh being 85 *per cent* basic price of the equipment (Rs 100.57 lakh) plus 100 *per cent* cost of spares (Rs 6.63 lakh) and Central Sales Tax (Rs 5 lakh) between August 1998 and June 1999 as per the conditions of the purchase order. The equipment received in June 1999 could not be installed as the plant site was not ready and was stored in a shed in disassembled condition.

Though the balance 15 *per cent* basic cost of the equipment (Rs 17.75 lakh) was payable only after satisfactory installation, commissioning and final

acceptance of the furnaces, in December 1999 DPS released Rs 12.50 lakh being 10 *per cent* basic cost of the furnaces to the supplier by amending the purchase order against a performance bond valid till November 2002.

Construction & Service Group of BARC initiated action for the foundation work for installation of the equipment in March 2000 but started the foundation work only in December 2001. BARC stated in July/September 2002 that the demolition work of thorium plant where the site for foundation work was to be taken up was delayed because of the disposal of radioactive waste and debris and that their burial took more time than expected. The land area was also found contaminated rendering the entry of labourers into the area impossible. BARC further stated that the site would be ready for installation of the equipment by the end of 2003. However, it should have been possible for BARC to anticipate the difficulties associated with the demolition of the thorium plant and disposal of radioactive material.

(b) DPS placed another order in March 2000 on the same firm for design, manufacture and supply of a Multipurpose Rotary Tubular Converter of 10 Kg/Hr capacity at a total cost of Rs 44.98 lakh including installation and commissioning charges of Rs 0.60 lakh payable on completion of satisfactory installation and commissioning of the equipment. The equipment was required to augment the production of UF4, the intermediate used for production of uranium ingots under the project "Production and Processing of Uranium Compounds – Upgradation of Technology". The warranty for the equipment was for a period of 18 months from the date of despatch of equipment or 12 months from the date of commissioning whichever is earlier.

DPS paid Rs 40.15 lakh being 90 *per cent* basic cost of the equipment plus 100 *per cent* Sales Tax between April 2000 and April 2001 as per the conditions of the purchase order. The equipment received in March 2001 could not be installed, as the plant site was not ready.

Though the balance 10 *per cent* basic cost of the equipment was payable only after satisfactory installation, commissioning and final acceptance of the equipment, DPS released Rs 4.22 lakh in February 2002 against a bank guarantee towards performance bond valid till January 2003. As of May 2002, BARC had not yet installed the equipment and expected that the site would be ready for its installation by 2003.

Thus, two Gas-tight High Temperature Rotary Tubular Converters and one Multipurpose Rotary Tubular Converter procured in June 1999 and March 2001 respectively, at a total cost of Rs 169.07 lakh could not be installed/commissioned even after the lapse of more than two to three years of

their receipt, as the infrastructure needed for their commissioning was not ready. With proper planning, such mismatches between procurement of equipment and their subsequent installation could have been avoided.

The matter was referred to the Department in December 2002, who have not replied as of January 2003.

CHAPTER 8 : DEPARTMENT OF SPACE

8.1 Acceptance of equipment not conforming to specifications

Vikram Sarabhai Space Centre, Thiruvananthapuram placed an order for procurement of a Laser Trimming System in 1998 with the power output of its laser source as 8 watts and the wavelength 1064 nanometers. However, the system received had the lower specifications of two watts and 532 nanometers. The system was installed and commissioned with this limited scope, that too after a delay of three years.

The Vikram Sarabhai Space Centre, Thiruvananthapuram placed an order in November 1997 for the supply and installation of a Laser Trimming System on California Digital Laser Systems Inc., USA through its Indian agent (EL Camino Technologies, Bangalore) at a cost of US Dollars 215,323. The power output of its laser source was specified as 8 watts and the wavelength 1064 nanometers. The System was intended as a replacement of the Laser Trimmer already available at the Space Centre, which was almost two decades old.

The System was received in June 1998. However, on unpacking the consignment and on its inspection, it was found that some of its components, such as a video camera mount parts of the beam positioning mechanism and workholder jig, etc., had been severely damaged. Besides, certain items included in the purchase order (spare parts kit and tool kit with power meter) had not been shipped. The system documentation was also found to be insufficient. On replacement of the damaged parts and the items short supplied being made good subsequently, the Space Centre paid Rs 82.35 lakh representing 90 *per cent* of the cost of the System, to the supplier in October 1998.

Though the price of the System included *inter alia* the cost of its acceptance, testing at the supplier's premises in the United States, specific stipulations in this regard were not incorporated in the purchase order and the Space Centre also elected not to depute its representatives to the supplier firm's premises. In May 1999, a representative of the supplier firm visited the Centre. His attempts to install the System and place it in a working mode were, however, unsuccessful. In the course of installation of the System, it was also observed that the power output of the laser source and the wavelength were only 2 watts and 532 nanometers respectively as against 8 watts and 1064 nanometers

specified in the purchase order. It was also observed that the fibre optic cable for illumination was damaged.

Instead of insisting on the supply of the System conforming to the stipulated specifications, it was commissioned by the Space Centre's engineers themselves and placed in the operational mode more than two years later in July 2001. Even thereafter, the output of the laser source was found to be only 4.5 watts, though the wavelength was found to be 1064 nanometers.

On the delay in installation and commissioning of the system not conforming to the stipulated specifications being pointed out in audit, DOS stated (December 2002) that the delay was solely due to the fact that the United States Government had imposed sanctions in the mean time and any kind of technical support for installation and commissioning was consequently not forthcoming from the supplier firm and that a number of very complex technical problems encountered had to be solved. DOS added that the power output of the laser source was adequate for the kind of work being done at present.

If, as stated, a power output of only 4.5 watts was adequate to meet the Centre's requirements, this ought to have been logically specified *ab initio* even while inviting tenders. Had this been done, more competitive and economical offers would conceivably have been received. It would, therefore, appear *prima facie* that the requirements and specifications were not assessed realistically. Besides, the Centre itself had brought to the notice of the Indian agent in July 2000 that, though the agent had submitted the quotation for the system on behalf of the foreign principals, the latter themselves had admitted that they had no expertise in regard to the complicated system and that their technical capabilities were rather superficial. Attention was also then drawn to the fact that the Indian agent was well aware that a System not conforming to the stipulated specifications had been shipped and that the principals had placed an order for a wrong laser. In the circumstances, acceptance of the System, involving substantial investment, would not appear to have been prudent or in the financial interests of Government.

CHAPTER 9 : DEPARTMENT OF INFORMATION TECHNOLOGY

9.1 Unfruitful Expenditure

The objective of indigenous production of LINAC machines could not be achieved even after expenditure of Rs 115.94 lakh due to inadequate planning and lack of initiative on the part of DOE (now DIT).

In July 1989, the Central Scientific Instrumentation Organisation (CSIO), Chandigarh, the Society for Applied Microwave Electronic and Engineering Research (SAMEER), Mumbai and the Post Graduate Institute of Medical Sciences (PGI), Chandigarh jointly developed a Linear Accelerator (LINAC) machine for cancer therapy at a cost of Rs 73 lakh under a project funded by the Department of Electronics (DOE). After satisfactory performance of this machine, DOE approved another project in March 1991 for development and commissioning of two LINAC machines. The project was to be implemented by SAMEER, Mumbai and CSIO, Chandigarh at a cost of Rs 154 lakh by September 1993. The project objective was to develop manufacturing capacity for LINAC, an item imported at a high cost. The indigenous technology would be less costly and would also save foreign exchange.

Meanwhile, in December 1990, DOE approved another project of CSIO, Chandigarh for development of a patient support system (couch) at a total cost of Rs 24.50 lakh. The couch was compatible with the LINAC system and complementary to it. The development of the patient couch along with the LINAC machine was expected to achieve complete indigenisation of the technology. It was also possible to adapt this system for simulator, cobalt therapy, CT scan and other such applications. This technology was transferred to M/s Bharat Heavy Electricals Limited at a lump sum royalty of Rs 6.50 lakh which was yet to be paid.

For future commercial production of the LINAC system, integrated along with the patient couch, five public sector undertakings were associated with the project from March 1991 and they were to contribute Rs 12 lakh each (total Rs 60 lakh) for the transfer of technology. DOE and the Department of Atomic Energy (DAE) were to contribute Rs 69 lakh and Rs 25 lakh respectively for the project. The two machines were to be commissioned by September 1993 at the Cancer Centre and Welfare Home (CCWH), Thakurpukur, Kolkata and the Regional Cancer Centre (RCC), Coochbehar, for treatment of cancer. RCC,

Coochbehar was identified specially for treatment of patients from the North Eastern States as there was no LINAC facility in these States.

While identifying the units for commissioning of the LINAC machines, DOE did not evaluate the availability of infrastructure facilities viz, civil works, water chillers and stabilizers, pumps, special doctors trained in Oncology, etc. required in the targeted hospitals. Resultantly, while one LINAC machine integrated with the patient couch was erected at CCWH Kolkata in December 1993, the other LINAC machine could not be installed in the absence of infrastructure facilities in RCC, Coochbehar, even though its integration with the patient couch was completed in July 1994 at BEL, Ghaziabad.

In October 1996, after a lapse of two years, an expert team from DOE visited RCC Coochbehar, who stated that matching and tuning work needed to be done at RCC, Coochbehar for installation. In May 1997, another expert team recommended an alternate location for installing the LINAC machine. In August 1998, the Union Territory of Chandigarh requested DOE for earmarking the LINAC machine for GMCH (Government Medical College and Hospital), Chandigarh. However, no immediate action was taken by DOE.

From July 1994 to March 2000, the integrated LINAC machine remained at BEL, Ghaziabad without being put to use and subsequently required repairs to make it operational. In April 2000, DOE decided to shift the LINAC machine to SAMEER for making the system operational. As of November 2002, SAMEER, Mumbai had spent Rs 13.56 lakh on dismantling and refurbishment of the LINAC machine and its integration and testing. During the integration, SAMEER noticed that some items were missing from the LINAC machine. SAMEER also pointed out that the LINAC tube as well as the magnetron had outlived their guaranteed life and their actual behavior, once made functional, was not predictable. GMCH, Chandigarh refused to bear the additional cost of replacement of the items at the very outset. Finally the Department of Information Technology had to release Rs 30 lakh to SAMEER for the new LINAC tube (costing Rs 22 lakh) and magnetron (costing Rs 8 lakh). However, the LINAC machine was yet to be installed in GMCH, Chandigarh (October 2002).

Due to lack of planning and delay by DOE in promptly identifying an alternate location for installation of this machine, the expenditure of Rs 72.38 lakh remained unfruitful. Besides, eight years of delay also resulted in an avoidable expenditure of Rs 13.56 lakh in refurbishment of the LINAC machine, and additional expense of Rs 30 lakh for replacement of LINAC tube and magnetron. The larger objective of indigenous production of LINAC

machines also suffered a setback, since three of the five identified Public Sector Undertakings also dropped out of the project subsequently without paying the technology fee of Rs 12 lakh.

The matter was referred to the Department in August 2002, who have not replied as of January 2003.

CHAPTER 10 : MINISTRY OF ENVIRONMENT AND FORESTS

10.1 Avoidable payment of interest and non-receipt of refund of Income Tax

Indian Council of Forestry Research and Education paid excess Income Tax of Rs 69.45 lakh on account of payments made to a consultant. In order to obtain the refund, ICFRE was to present the original tax deduction at source certificate to the Income Tax authorities. However, ICFRE dispatched the TDS certificate to the consultant who failed to return it.

In order to strengthen the capacity of national and state forest institutions to plan and undertake priority research programs, Indian Council of Forestry Research and Education (ICFRE) entered into an agreement with International Development Association (IDA) in March 1994 for obtaining a loan of US $47.00 Million under Forestry Research, Education and Extension Project (FREEP). The main components of the project were civil works, purchase of equipment and consultant's services and training.

ICFRE entered into an agreement with M/s Winrock International Institute for Agriculture Development, USA (Consultant) in September 1994 for assisting ICFRE in developing a methodology for setting research priorities at national, institute and programme levels and in the forestry research development plan. The total amount payable to the consultant was US $2894271, which included payments on account of remuneration for basic services, pocket expenses, airfares, and miscellaneous expenditure for computer software in various research areas and was to be funded out of the credit receipt of IDA under FREEP. The payment to the consultant was to be made in instalments from time to time as the work progressed. The World Bank guidelines for entering into contracts with foreign consultants envisaged that the remuneration from the contract would be subject to normal tax liability in India, but that the client would pay directly or reimburse the taxes and other impositions in India related to payments in connection with carrying out the assignment. Accordingly ICFRE made a provision to this effect in the agreement signed with the consultant.

ICFRE paid Rs 408 lakh to the consultant in instalments up to May 1998 for the consultancy provided by them. The Drawing and Disbursing Officer however, failed to discharge the income tax liability fully on time.

Subsequently, on demands raised by the Income Tax authorities for payment of tax at the rate of 30 *per cent*, ICFRE deposited Rs 147.56 lakh along with interest on account of delayed payment at the rate of 15 *per cent* per annum by February 1999.

After the issue was pursued by ICFRE, the Income Tax authorities agreed to revise the rate of tax from 30 *per cent* to 15 *per cent* in February 2001, keeping in view the double taxation avoidance agreement with the USA wherein taxation at the rate of 15 *per cent* had been provided, for payments in consideration of any technical or consultancy services, resulting in a claim for refund of Rs 69.45 lakh including interest element already paid.

Accordingly, in order to avail concessional rate of tax, ICFRE was to present the original tax deduction at source (TDS) certificate duly filled in, to the Income Tax authorities. However, ICFRE dispatched the TDS certificate to the consultant who failed to return it. The failure to submit the required certificate to the Income Tax department resulted in ICFRE not receiving the refund of Rs 69.45 lakh including interest on account of delayed payments.

The matter was referred to the Ministry in September 2002, who have not replied as of January 2003.

CHAPTER 11 : GEOLOGICAL SURVEY OF INDIA

11.1 Avoidable payment due to lack of planning and delay

Geological Survey of India purchased land for a residential complex without adequate assessment of its priorities and incurred a loss of Rs 23.68 lakh on account of ground rent, extension fee etc, when the land was finally surrendered.

In March 1990, the Geological Survey of India (GSI), Chandigarh, with the approval of the Ministry of Steel and Mines, purchased a piece of land on lease basis measuring 3.98 acres in Sector 44-A from the Chandigarh Administration at a cost of Rs 33.90 lakh for construction of residential complex/ quarters. The possession of the land was taken in March 1992.

The terms and conditions of allotment provided for the completion of the building within three years from the date of allotment, failing which an extension fee would be levied. Besides, ground rent at the rate of Rs 0.85 lakh was payable annually from the date of allotment of land. It also provided for cancellation of the lease and resumption of site in the event of default, breach or non-compliance with the conditions of lease and forfeiture of the whole/part of the amount paid towards premium/rent.

In November 1992, GSI requested the Central Public Works Department to provide the layout plan and estimates for construction. In January 1994, GSI, Chandigarh, forwarded the layout plan to the Deputy Director General, GSI, Lucknow, for approval. As no approval was forthcoming from GSI, Lucknow, it directly forwarded the layout plan in May 1996 to its Headquarters at Kolkata for approval. In September 1996, GSI (Headquarters) stated that due to fund constraints, construction of the residential quarters was not to be given priority. In October 1998, GSI, Chandigarh, requested its Headquarters for a decision on whether the land was to be handed over or the quarters were to be constructed. In July 1999, the Ministry of Steel and Mines accorded approval for surrendering the land. In August 1999, GSI, Chandigarh, approached the local administration in order to surrender the land. The lease deed was cancelled in October 2000. The Chandigarh Administration also ordered forfeiture of 10 *per cent* of the premium of the site plus payment of ground rent till the date of cancellation/surrender.

Meanwhile, GSI had paid Rs 5.93 lakh on account of ground rent for the period March 1993-September 2000. In addition, an extension fee of Rs 12.87

lakh was paid for non-construction of quarters. The local Administration refunded Rs 29.02 lakh.

Thus, the action of GSI, in purchasing land for residential quarters without ensuring the availability of funds coupled with the delay in deciding to surrender the land, led to an avoidable payment of Rs 23.68 lakh.

The matter was referred to the Ministry in June 2002, who have not replied as of January 2003.

(R.P. SINGH)
Principal Director of Audit,
Scientific Departments

New Delhi
Dated 25 February 2003

Countersigned

(VIJAYENDRA N. KAUL)
Comptroller and Auditor General of India

New Delhi
Dated 25 February 2003

APPENDIX-I

Grants released to Autonomous Bodies audited under section 19(2) and 20(1) of Comptroller and Auditor General's (Duties, Powers & Conditions of Service) Act, 1971

Sl. No.	Name of the Autonomous Body	Amount of grants released in 2001-2002 *(Rs in crore)*
1.	Wild Life Institute of India, Dehradun	6.22
2.	Central Zoo Authority of India, New Delhi	10.80
3.	Sree Chitra Tirunal Institute of Medical Sciences & Technology, Thiruvananthapuram	22.60
4.	Technology Development Board, New Delhi	57.00
5.	Indian Council of Agricultural Research, New Delhi	1343.76
6.	Indian Council of Medical Research, New Delhi	188.63
7.	Council for Scientific and Industrial Research, New Delhi	892.26
Total		**2521.27**

APPENDIX-II

Grants released to Autonomous Bodies audited under section 14 of Comptroller and Auditor General's (Duties, Powers & Conditions of Service) Act, 1971

Sl. No.	Ministry/Department Name of the Autonomous Body	Amount of grants released in 2001-02 *(Rs in crore)*
DEPARTMENT OF ATOMIC ENERGY		
1.	Tata Memorial Centre, Mumbai	82.63
2.	Saha Institute of Nuclear Physics, Calcutta	28.43
3.	Institute of Physics, Bhubaneswar	10.22
4.	Atomic Energy Education Society's School, Mumbai	8.52
5.	Tata Institute of Fundamental Research, Mumbai	97.48
6.	Mehta Institute of Mathematical Physics, Allahabad	7.99
7.	Institute of Plasma Research, Ahmedabad	46.29
8.	Institute of Mathematical Science	10.52
	Total	**292.08**
DEPARTMENT OF BIO-TECHNOLOGY		
9.	National Institute of Immunology, New Delhi	17.08
10.	National Centre for Cell Science, Pune	9.20
11.	Centre for DNA finger printing and Diagnostics, Hyderabad	10.25
12.	National Centre for Plant Genome Research	5.00
13.	National Brain Research Centre	8.00
	Total	**49.53**
DEPARTMENT OF INFORMATION TECHNOLOGY		
14.	Centre for Development of Advance Computing, Pune	10.00
15.	Society for Applied Microwave Electronics Engineering Research, Mumbai	14.70
16.	Electronic Research and Development Centre of India	10.70
17.	National Centre for Software Technology, Mumbai	2.60
18.	Centre for Materials	2.00
19.	Centre for Liquid Crystal Research, Bangalore	1.70
20.	Education & Research Network (ERNET) India	5.00
21.	Centre for Electronics Design and Technology of India	5.50
22.	Electronics and Computer Software Export Promotion Council	4.00
	Total	**56.20**
MINISTRY OF ENVIRONMENT, FORESTS		
23.	Central Pollution Control Board, New Delhi	15.93
24.	Indian Institute of Forest Management, Bhopal	5.69
25.	Indian Council of Forestry Research & Education, Dehradun	58.13
26.	Padmaja Naidu Himalayan Zoological Park, Darjeeling	0.12

Sl. No.	Ministry/Department Name of the Autonomous Body	Amount of grants released in 2001-02 *(Rs in crore)*
27.	Indian Plywood Industries Research and Training Institute,Bangalore	1.91
28.	Centres of Excellence	7.50
	Total	**89.28**
DEPARTMENT OF SCIENCE & TECHNOLOGY		
29.	Raman Research Institute, Bangalore	9.55
30.	Bose Institute, Calcutta	11.50
31.	Indian Institute of Tropical Meteorology, Pune	5.50
32.	Indian Association for Cultivation of Science, Calcutta	11.81
33.	Indian Institute of Astrophysics, Bangalore	22.45
34.	Indian Institute of Geo-magnetism, Mumbai	9.37
35.	Indian Science Congress Association, Kolkata	1.11
36.	Indian National Science Academy, New Delhi	6.35
37.	Birbal Sahni Institute of Palaeobotany, Lucknow	5.25
38.	Wadia Institute of Himalayan Geology, Dehradun	5.06
39.	S.N.Bose National Centre for Basic Sciences, Calcutta	3.36
40.	Indian Academy of Sciences, Bangalore	1.70
41.	J.N. Centre for Advanced Scientific Research, Bangalore	7.50
42.	National Academy of Science, Allahabad	1.25
43.	Technology Information Forecasting and Assessment Council, New Delhi	37.64
44.	Vigyan Prasar, New Delhi	1.20
45.	Agharkar Research Institute, Pune	3.90
46.	Advanced Research Centre for Metallurgy, Hyderabad	6.60
	Total	**151.10**
DEPARTMENT OF SPACE		
47.	National Remote Sensing Agency, Hyderabad	11.00
48.	Physical Research Laboratory, Ahmedabad	26.96
49.	National MST Radar Facility , Gadanki	2.03
50.	North Eastern Space Application Centre	5.00
	Total	**44.99**
DEPARTMENT OF OCEAN DEVELOPMENT		
51.	Indian National Centre for Ocean Information Services	6.75
52.	National Centre for Antarctic & Ocean Research	19.51
53.	National Institute for Ocean Technology	30.30
	Total	**56.56**
	Grand Total	**739.74**

APPENDIX-III

Outstanding Utilisation Certificates

Ministry/Department	Period to which grant relates	Number of utilisation certificates outstanding at the end of March 2001	Amount *(Rs in lakhs)*
Atomic Energy	1988-89	1	0.31
	1991-92	1	2.51
	1992-93	1	0.37
	1994-95	3	2.22
	1995-96	1	1.19
	1996-97	12	13.45
	1997-98	12	36.20
	1998-99	16	56.09
	1999-00	32	182.82
	Total	**79**	**295.16**
Environment & Forest	1981-82	15	5.79
	1982-83	21	41.00
	1983-84	90	58.50
	1984-85	143	229.80
	1985-86	121	495.40
	1986-87	74	533.77
	1987-88	290	8909.92
	1988-89	359	2543.18
	1989-90	549	194.23
	1990-91	70	123.30
	1991-92	91	1539.88
	1992-93	232	3026.11
	1993-94	64	74.18
	1994-95	142	1204.24
	1995-96	12	24.50
	1996-97	485	15815.12
	1997-98	612	9852.58
	1998-99	431	463.09

Ministry/Department	Period to which grant relates	Number of utilisation certificates outstanding at the end of March 2001	Amount *(Rs in lakhs)*
Environment & Forest	1999-00	542	10070.42
	Total	**4343**	**55205.01**
Ocean Development	1983-84	8	101.52
	1984-85	22	22.66
	1985-86	45	40.26
	1986-87	23	27.20
	1987-88	3	175.04
	1988-89	66	59.25
	1989-90	95	106.42
	1990-91	17	227.46
	1991-92	27	124.51
	1992-93	8	3.00
	1993-94	16	40.20
	1994-95	10	160.47
	1995-96	53	58.77
	1996-97	54	152.82
	1997-98	84	925.95
	1998-99	96	1354.95
	1999-00	72	2814.65
	Total	**699**	**6395.13**
Space	1976-77	1	0.05
	1979-80	2	0.21
	1980-81	1	0.38
	1981-82	1	0.03
	1982-83	9	2.87
	1983-84	5	0.75
	1984-85	12	2.23
	1985-86	4	1.05
	1986-87	11	3.95
	1987-88	6	4.98
	1988-89	1	0.05
	1989-90	3	3.08

Ministry/Department	Period to which grant relates	Number of utilisation certificates outstanding at the end of March 2001	Amount *(Rs in lakhs)*
Space	1990-91	4	5.64
	1991-92	1	1.24
	1992-93	1	1.01
	1993-94	2	1.28
	1994-95	8	11.07
	1995-96	6	1.55
	1996-97	12	10.79
	1997-98	5	4.95
	1998-99	23	6.83
	1999-00	31	34.56
	Total	**149**	**98.55**
Information Technology	1999-00	15	1678.00
	Total	**15**	**1678.00**
Non-conventional Energy Sources	1983-84	3	13.17
	1984-85	1	2.19
	1993-94	1	2.43
	1994-95	4	22.18
	1995-96	22	33.93
	1996-97	32	48.47
	1997-98	34	62.26
	1998-99	24	106.66
	1999-00	21	326.80
	Total	**142**	**618.09**
Grand Total		**5427**	**64289.94**