

I. AN OVERVIEW

1. INTRODUCTION

The Department of Scientific and Industrial Research (DSIR) is a part of the Ministry of Science and Technology, which was set up through a Presidential Notification, dated January 4, 1985 (74/2/1/8 Cab.). The mandate of DSIR includes indigenous technology promotion, development, utilization and transfer. Shri Kapil Sibal is the Hon'ble Union Minister for Ministry of Science & Technology and Earth Sciences.

The Allocation of Business for the Department is as follows:

- All matters concerning the Council of Scientific & Industrial Research
- All matters relating to National Research Development Corporation (NRDC)
- All matters relating to Central Electronics Limited (CEL)
- Registration & recognition of R&D units
- Technical matters relating to UNCTAD & WIPO
- National Register for Foreign Collaborations
- Matters relating to creation of a pool for temporary placement of Indian scientists & technologists.

The primary endeavour of DSIR is to promote R&D by the industries, support small & medium industrial units to develop state-of-the art globally competitive technologies of high commercial potential, catalyze faster commercialization of lab-scale R&D, enhance the share of technology intensive exports in overall exports, strengthen industrial consultancy & technology management

capabilities and establish user friendly information network to facilitate scientific and industrial research in the country. It also provides a link between scientific laboratories and industrial establishments for transfer of technologies through National Research Development Corporation (NRDC) and facilitates technology development in select areas through Central Electronics Limited (CEL). The specific initiatives for achieving these objectives include:

- a) Technology Promotion, Development and Utilization (TPDU) Programme
- b) Council of Scientific & Industrial Research (CSIR)
- c) Consultancy Development Centre (CDC)
- d) National Research Development Corporation (NRDC)
- e) Central Electronics Limited (CEL)

2. TECHNOLOGY PROMOTION, DEVELOPMENT AND UTILIZATION PROGRAMME

The scheme "Technology Promotion, Development and Utilization (TPDU) Programme" has been formulated by merging the following *Ninth Plan* schemes as per the recommendation of the Planning Commission under zero based budgeting exercise.

- Research & Development by Industry (RDI)
- Programme Aimed at Technological Self-Reliance (PATSER)
- Scheme to Enhance the Efficacy of Transfer of Technology (SEETOT)
- APCTT

Programmes and activities under the scheme are centered on promoting industrial R&D, development and commercialization of technologies, acquisition, management and export of technologies, promotion of consultancy capabilities, etc. The specific components of the TPDU programme are:

- Industrial R&D Promotion Programme
- Technology Development and Innovation Programme
- Technology Management Programme
- International Technology Transfer Programme
- International Cooperation Programme
- Consultancy Promotion Programme
- Technology Information Facilitation Programme
- Gender Budget Cell
- Publicity and Promotion
- Information Technology & e-Governance

2.1 Major Achievements

Industrial R&D Promotion Programme

DSIR is the nodal Department for granting recognition to in-house Research and Development centres of industry. As on 31st December 2006, there were 1230 in-house R&D centres with DSIR recognition. Of these centres, 148 in-house R&D centres incurred an annual expenditure of over Rs.5 crores each and 299 in-house R&D centres incurred an annual expenditure in the range of Rs.1 crore to Rs.5 crores.

During the year 2006, 101 in-house R&D centres were accorded fresh recognition and recognition of 448 in-house R&D units was renewed. As a part of the promotional efforts, the 20th National Conference on in-house

R&D in industry was organised; and National Awards were presented to 7 industrial units. A publication on “Outstanding in-house R&D Achievements (2006)” and 3 issues of “In-house R&D in Industry Update” were brought out.

Scientific research foundations in the areas of medical, agriculture, natural & applied sciences and social sciences seek DSIR approval as Scientific and Industrial Research Organisations (SIROs) under the DSIR scheme of granting recognition to SIROs. The approved SIROs are eligible for availing customs duty exemption on imports and central excise duty exemption on indigenous purchase of essential scientific & technical instruments, apparatus, equipment (including computers), accessories, spare parts thereof and consumables, required for research and development activities. During the year 2006, 33 new SIROs have been accorded recognition.

The department also issued 7 certificates for accelerated depreciation allowance on indigenous technology based plant & machinery involving an investment of Rs.3464 lakhs; 576 essentiality certificates for claiming customs duty exemptions on imports, amounting to Rs.5000 lakhs and 75 essentiality certificates for claiming central excise duty exemptions on indigenous purchases, amounting to Rs.390 lakhs.

DSIR is the nodal Department for registration of public funded research institutions, universities, IITs, IISc., RECs/NITs, for availing customs duty exemption and central excise duty exemptions under notifications 51/96-Customs and 10/97-Central Excise. During the year 2006, 6 such institutions were registered with DSIR; and 225 institutions were granted renewal of registration.

Secretary, DSIR, who is designated as the Prescribed Authority under section 35(2AB)

of Income-tax Act, 1961, approved in-house R&D centres of 37 companies during the year. Agreements of co-operation for research & development were also signed with these companies. R&D expenditure of 64 companies were reported to DGIT (E) in Form 3CL.

Technology Development and Innovation Programme

The programme has two sub-components: Technology Development and Demonstration Programme to support technology development efforts of industry - R&D system and Technopreneur Promotion Programme (TePP) to nurture the innovative spirit of individuals.

The component programme, Technology Development and Demonstration aims at catalyzing and supporting activities relating to technology absorption, adaptation and demonstration including capital goods development, involving industry and R&D organizations. Under the programme, research, development, design & engineering projects for absorption and up-gradation of imported technology as well as development & demonstration of new and improved technologies have been supported. While DSIR support has been catalytic and partial, bulk of the financial contribution in any project has been from the industry.

The Department, under this programme has so far supported about 190 R&D projects of Industrial units. These projects cover products and processes in various important industries such as metallurgy, electrical, electronics, instrumentation, mechanical engineering, earth moving & industrial machinery, chemicals & explosives. So far 108 projects have been completed and over 35 technologies developed under the scheme have been commercialized or under

commercialization. During the year, 56 Technology Development Demonstration projects supported under the scheme were reviewed. There are 35 companies paying royalty/lump-sum as per the terms of agreement under the programme.

Technology Development projects have strengthened the linkages with more than 25 national research laboratories/ institutions such as NAL, Bangalore; RRL, Trivandrum; IICT, Hyderabad; CMRI, Dhanbad; IIP, Dehradun; C-DAC, Pune; Institute of Plasma Research, Ahmedabad; ER&DC, Trivandrum; Dalmia Centre for Biotechnology, Coimbatore; CMTI, Bangalore; which have been collaborating with industry in the specific research, design, development & engineering (RDDE) projects of high techno-socio-commercial impact. The Scheme has been found successful in synergising the R&D efforts of industry and national research organizations.

The Technopreneur Promotion Programme (TePP) is a novel programme to extend financial support to individual innovators for converting their innovative ideas into working prototypes/models. Jointly operated by DSIR and Technology Information, Forecasting and Assessment Council (TIFAC) of the Department of Science and Technology (DST), TePP endeavours to tap the vast innovative potential of the citizens of India. So far, 161 projects of individual innovators were supported under the programme - 85 by DSIR and 76 by DST/TIFAC. Some of the successfully developed TePP projects during the year were Anti-fungal principles of *Alseodaphane* species, Digital camera for *fundus* photography, Intrauterine distending system, Everybody's solar water heater, Synthesis of novel tetracyclic benzothiazepines as potential anti-inflammatory and anti-fungal agents, Solar water harvestor etc.

Technology Management Programme

The major objective of the Technology Management Programme is to provide technical inputs and support mechanisms for efficient transfer and management of technology. A number of technology and management related studies were taken up / carried out under the programme during the year. These include i) 'Potential of Minor Forest Produce (MFP) based industries in select regions' like Andhra Pradesh, Gujarat, Tamil Nadu and West Bengal ii) Status and potential of karaya gum iii) Study on the "Technology Status" on Isabgol based Industries iv) Study on "Technology and Innovation Management Issues" v) Study on the "Status and Prospects of Industry-Institute Collaborations in Emerging Technologies" vi) Study on 'Management of Technology in the Automotive Sector' and vii) Study on 'Social Capital and Technology'. Study on common modern tool room facility with a view to identify the requirements of tool room facilities of SMEs in and around Coimbatore has also been completed.

The case studies covering "Technology Management" aspects supported under the programme includes i) A case study on operational strategies of pump industries conducted by PSG Institute of Management, Coimbatore and ii) A case study on the industrial units of Govindpura Industrial Cluster in Bhopal conducted by Madhya Pradesh Council for Science & Technology (MPCOST), Bhopal. DSIR under the programme has initiated the setting up of Centres for Technology and Innovation Management in PSG Institute of Management, Coimbatore, Madhya Pradesh Council of Science & Technology (MPCOST), Bhopal and IIT, Mumbai, etc. Newsletters are being brought out on specific technology management aspects in association with IIT Mumbai, PSGIM

Coimbatore, KCTU Bangalore and MAPCOST Bhopal.

International Technology Transfer Programme

Under the International Technology Transfer Programme (ITTP), major activities completed or in progress during the year include: organisation of INDIA TECH 2006 (10th Technology Trade Pavilion) at India International Trade Fair (IITF) 2006, Pragati Maidan, New Delhi; participation in Hannover Fair, 2006; continuation of support to the activities of Technology Export Development Organisation (TEDO) in the second phase; continuation of support to the Centre for International Trade in Technology at IIFT in the second phase; support to a project on Promoting high Technology Co-operation and Trade between India and CIS Countries in association with Department of Commerce; continuation of support to the Technology Trade Facilitation Centre at National Research Development Corporation; organization of a Clinic-cum-Awareness Programme for Design Intervention in Furniture Clusters at Delhi; organization of third International Awareness-cum-Training Programme on Packaging Technologies and Machinery for Food Processing Sector; compilation of "Exportable Technologies from SMEs in the States of Andhra Pradesh, Karnataka, Punjab, Haryana, HP, J&K, Tamilnadu and Kerala; compilation of a "Compendium on Technology Exports" – containing data up to 2004-05; and publication of a newsletter on technology exports. All these efforts have catalyzed technology intensive and high value added exports. The percentage of such exports, in the overall exports, has steadily increased over the years. A large segment of exporting community has been trained and sensitized towards high value added exports.

International Cooperation

DSIR continues to play the role of being the focal point for the APCTT, an agency under ESCAP facilitating the establishment of networks of technology transfer intermediaries in the region to promote cross-border business cooperation among SMEs. During 2006, more than 50 technology offers and 30 technology requests were registered in the databank. About 900 technology queries were serviced and 150 introductions were facilitated among technology seekers and technology providers for technology transfer discussions. Technology match-making and support services to the members of INTET ASIA members were also offered. APCTT implemented a project for the establishment of a Biotechnology Information Network in Asia (BINASIA) in accordance with the request of members and associate members of ESCAP. DSIR supported APCTT to implement the project, "Promotion of National Innovation Systems (NIS) in Countries of the Asia Pacific Region". As many as six workshops/meetings were organised under the project in different countries like Philippines, Islamic Republic of Iran, Indonesia, China and Pakistan including India.

Consultancy Promotion Programme

The programme relating to consultancy promotion aims to strengthen the nation's consultancy capabilities for domestic and export markets. During the period under report, IT Consultancy Clinic for SMEs in NOIDA was progressing satisfactorily. Besides, three consultancy clinic on Hosiery Industry at Kanpur, Jute & Jute Diversified Products at Kolkata and Design & Engineering centre for mould design used in Automotive & Durable Consumer Goods with high surface finish at Coimbatore were supported. A document on "Procedure for

Selection of Consultants, Fee structure for consultancy services and Standard Contract Agreement" prepared by Consultancy Development Centre was sent for Government approval and circulation to various government departments, PSU's and other organization as guidelines. Also, technical inputs/ support was provided to Consultancy Engineers Association of India (CEAI) and other consultancy promotion organizations.

Technology Information Facilitation Programme

Technology Information and Facilitation Programme (TIFP) has the broad objective of generating endogenous capacities for the development and utilization of digital information resources to facilitate accelerated S&T research. The specific achievements of the programme during the period of report include promotion of content development, Development of national websites / servers, Indian Digital Library of Theses and R&D Publications, Documentation of community knowledge, traditional knowledge and oral traditions in various districts of the states of Karnataka, Tamil Nadu, Rajasthan and West Bengal and establishment of a Virtual Information Centre, <http://www.vic-ikp.info> at ICICI Knowledge Park (ICCIKP), Hyderabad to provide fast and reliable access to information among industry, academia and public research institutions in the area of S&T. The programme also supported a number of surveys and R&D studies, some of which are i) Feasibility Study on the Self-Sustainability of Information Support Facilities in and around Industrial Clusters of SMEs ii) Impact of Technology on Quality of Service Deliveries in Technical and Management Libraries in Karnataka, Manipal and iii) GIS based Digital Atlas of the Sacred Groves of the North East India: Pilot study with Sacred Groves of Arunachal Pradesh.

The programme also supported education and training programmes on digital content development for Human Resources Development of Rubber Industry and web based interactive multimedia training programme on digitization and digital libraries.

Information Technology & e-Governance

As a new initiative, IT & e-Gov unit was formed for progressive implementation of e-Governance to establish an IT enabled work environment. The client server applications like 'INTRADSIR', 'DMIS' and 'CINFOSYS' were operational during the year. Some of the client server applications designed was Public Grievances Redress and Monitoring System 'PGRAMS', Procurement and Inventory Management System 'PIMS' for DSIR stores, and Foreign Collaboration Approvals Information Management System (FCAIMS). The on going IT-eG activities like DSIR website updations and work on Project Application and Monitoring System 'PAMS' continued during 2006.

Gender Budgeting Cell

The Gender Budgeting Cell has been set up in the Department as per the guidelines/circulars issued by the Ministry of Finance for promoting gender budgeting. The programme is aimed at meeting specific needs of women and to enhance their contribution towards technology capability building. Some of the projects supported under the programme during the year are i) "Impact of the Information and Communication Technology on women employment in Kerala" by Centre for Development Studies, Trivandrum ii) "Economic Development of Women SHG member of Talala Taluka in Junagadh District" by Saurashtra Economic Development Centre, Junagadh iii) "Status of Women Entrepreneurship in Andhra Pradesh" by National Institute of Small Industry

Extension Training (NISJET), Yousufguda, Hyderabad iii) "Technology Adoption and Utilization Programme for women in Handicraft Sector" by Kerala Rural Development Agency [KRDA], Kollam, Kerala and iv) "Upgrading indigenous technology for preparation of herbal products as home remedies and food supplements by encouraging sustainable cultivation, conservation and propagation of medicinal plants involving rural women of West Bengal" by Ram Krishna Mission, West Bengal etc.

Publicity and Promotion

The Department is making concerted efforts to create awareness among industry, R&D establishments, academia, consultants and public in general, about the incentives and support mechanisms available under the departmental programmes and schemes with a view to encourage more and more agencies and individuals to take advantage of the facilities provided by the Department. The Department also endeavours to share with public at large the success stories of its schemes/programmes and activities. The media adopted by DSIR to publicise its activities are Printed Literature, Advertisement in leading journals/bulletins and newspapers, Departmental Website, Audio – Visual Documentary Films and Workshops.

3. AUTONOMOUS INSTITUTIONS

3.1 COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH (CSIR)

The council has been able to achieve number of major innovations and these are described below:

Anti-leukemic Compound from Paan Leaves

IICB scientists have isolated from the leaf of the betel plant (*piper betel*) a compound that

is able to induce death of cancer cells in chronic myeloid leukemia (CML) -- a type of cancer that attacks white blood cells.

New Lead Molecule for Malaria

NIO has reported that the crude extract prepared from a marine organism (mussel) by the enzyme-acid hydrolyzing process shows a potent anti-malarial activity, when examined for *in-vitro* cultures of *Plasmodium falciparum* in human erythrocytes. The molecular entity responsible for anti-malarial activity was isolated & characterized.

Oral Delivery of Insulin & Hepatitis B Vaccine

IICT has developed a process for the oral delivery of Insulin and also of Hepatitis B vaccine. This new invention is a boon to the diabetic population showing the reduction of blood glucose levels comparable to that of the injectable insulin.

Bioactive Integrated Orbital Implants

CGCRI has designed and fabricated two varieties of porous hydroxyapatite-based orbital implants which have been clinically tried in more than 100 patients at different hospitals in India, as yet with no report of post-operative complications. One of the significant advantages of these Hap implants over the glass/polymeric material is that they become invested with fibro-vascular tissues of the orbit and provide natural movement to the eye.

Collagen Based Biomaterials

CLRI has developed Gelatin micro spheres wherein SSD loaded collagen membranes have been evaluated for wound healing. It was found that wound healing is accelerated by ~ 60%. Batch process for soluble collagen and four wound care management products has been standardized.

Fawn Birth by Artificial Insemination

CCMB has achieved successful delivery of a live fawn by artificial insemination of a female deer. This is the first successful artificial non-surgical intra-vaginal insemination in the spotted deer in India, which led to the birth of a fawn.

Control of Quiescence in Muscle Stem Cells

CCMB established a culture model of quiescent satellite cells using G₀ synchronized myoblasts. Studies at CCMB suggests that regulation at multiple levels from chromatin modulation of transcription to regulation of cytoskeletal and membrane dynamics, and metabolic controls of nutrition, energy and cellular redox state co-operate to sustain the arrested progenitor cell, prevent precocious differentiation and maintain signal responsiveness.

Arsenic and Iron Removal Plant

CGCRI has developed technology for arsenic and iron removal based on ceramic membrane technology for the production of safe drinking water from contaminated ground water. CGCRI has installed eight community models of arsenic and iron removal plants of capacity of 2500 litre per day, which are operating in West Bengal.

“CIM-ASVIKA” Multi Utility Portable Distillation Unit

CIMAP released a low cost and simple to operate multi-utility portable distillation unit “CIM-ASVIKA” useful for the farmers in rural areas and small scale entrepreneurs. Features include low cost portable type unit specially designed for producing high quality natural rose water. It can also be used for extraction of spices and other aromatic oils.

Synthesis of FEMA GRAS Approved Flavouring Agent: 4-vinylguaiacol

IHBT has developed a unique and novel process for the synthesis of 4-vinylphenols in microwave curtailing the two step process into a single step in an environment friendly manner. The method developed imbibed the principles of green chemistry and reflects the advantages over the existing protocols. Also, the cost of production is reduced manifold.

PWM Amplifier for Electromechanical Actuator

CEERI has developed integrated position control system for an underwater guided vehicle. It has pulse width modulation scheme for high efficiency bi-directional PWM scheme for improved stiffness, conforms to mil 883 environmental specification with cost and reliability competitive with other international products.

Myoelectric Arm

CSIO, in collaboration with CMERI, has developed lab model of myoelectric arm. The prototype was tested on patients at National Institute for Orthopaedically Handicapped (NIOH), Kolkata. The patients were able to perform many mechanical activities with this arm, viz. drinking water, writing, plucking flowers, picking and placing of objects from one place to another.

20 KW Radio Frequency Quadruple (RFQ)

CMERI in collaboration with Variable Energy Cyclotron Centre (VECC), Kolkata has designed, developed and fabricated 20KW Radio Frequency Quadruple (RFQ). The RFQ is operating at 33.7 MHz accelerated 21 KeV 3^{+16}O beam from the ECR up to an energy level close of 500 KeV.

Indigenous Molecular Beam Instrument

NCL has developed a simple, compact and economically viable Molecular Beam Instrument (MBI). Catalytic reactions are, in general, too complex and information on the elementary steps is not easily available. MBI enables study of heterogeneous catalytic reactions on active metal surface in a clean environment under vacuum and provides fundamental information about the catalytic reactions, such as, transient kinetics and kinetic parameters. Such vital information helps to derive the mechanistic pathway of complex reactions.

Ultrafiltration Membrane-based Water Purifier

NCL has developed an Ultrafiltration membrane with pores too small to permit viruses and bacteria. Special additive used in the dope solution for membrane casting controls membrane porosity and offers membranes with desirable pore size. It operates on normal tap water pressure (0.5 bar) and does not require electricity.

Small Tractor

CMERI has developed a 10HP small tractor named as **Krishishakti** to aid farm mechanization. Weighing at 800 Kg it has single cylinder, water cooled, 10HP diesel engine and has automatic draught control with lifting capacity of 450 kg.

Long Afterglow Luminescent Powder

NPL has developed long decay phosphor powder, which can be processed into many different media and can be used in a variety of applications. The applications include back lighting of liquid crystal displays, bank notes, enamels and ceramic tiles, flexible & rigid

plastics for switches and consumer goods, warning signs and accident prevention etc.

Health Assessment of Bridges and Other Structures

SERC has designed fiber optic sensor based structural health monitoring towards predicting the time-dependent losses in prestressing steel and evaluating the stress condition of concrete in the beam.

Dynamic Fog Forecasting System

C-MMACS has developed and calibrated a visibility model Fog Forecast Engine which is a combination of high performance computing, new generation dynamical meso-scale models, advanced data analysis and informatics. The platform has been tested in an operational setting since November, 2005 for Delhi Airport, with a web-based sales management system.

Excelling in Scientific & Industrial Research Output

CSIR's basic research contributions scored an all time high in terms of number and international recognitions. A total of 3018 basic research papers have been published in internationally peer reviewed journals with an average impact factor per paper of 2.01 which is comparable to that of leading institutions like TIFR, IISc etc. Several of CSIR's breakthroughs have been picked by prestigious international research publications and highlighted them on their cover pages. During the year CSIR was granted 178 patents abroad whereas it has filed 570 patents abroad and 407 in India. It has secured 22 copyrights and 4 trademarks as well. The external cash flow was Rs.341 crore from its contract R&D.

3.2 Consultancy Development Centre

The Consultancy Development Centre (CDC)

came into being as a registered society in January 1986, and is functioning from its office at India Habitat Centre Complex since May 1994. The CDC was approved as an Autonomous institution of DSIR in December 2004. DSIR provides financial support to CDC each year based on performance and review. During 2005-06, 2 seminars were organised on the topic "Development of Domestic Consulting Skills" in association with the Asian Development Bank (ADB) at Hyderabad and Chennai. The Centre conducted 12 DSIR sponsored programmes. Out of these, 7 programmes were on "Technology Management: Prospects and Profits" conducted at Chandigarh, Patna, Jamshedpur, Bhubaneswar, Lucknow, Dehradun and Shimla, 3 programmes were on "Consultancy and Services Sector: Challenges and Prospects" conducted at Jaipur, Kanpur and Pune and 2 programmes were on "Capacity Building for SMEs: Role of Consultancy and Technology organized at Dimapur (Nagaland) and Aizawl (Manipur). The centre obtained 7 new projects – 3 in the area of ISO 9001:2000, 3 in the area of ISO 17025:2005 Laboratory Accreditation and 1 project on "Integrated Management System for Occupational Health and Safety" for the Naval Dockyard, Vishakapatnam. The centre completed the study / assignments namely "Cost Benefit Assessment of CNG Introduction in Delhi" sponsored by Department of Environment, Govt. of NCT of Delhi, "Technology Management Practices in companies relating to Technology Transfer" sponsored by DSIR, and "Technology Assessment for improving the Quality of Wool for Carpet Manufactures" sponsored by Development Commissioner, Handicrafts, Ministry of Textiles. The Centre has developed a document on the subject "Procedures for selection of Consultants and Fee structure for consultancy services and standard contract agreement".

4. PUBLIC SECTOR ENTERPRISES

4.1 National Research Development Corporation (NRDC)

The Corporation provides comprehensive technology transfer services and acts as a catalyst for transforming innovative research into marketable industrial products. During the year, the Corporation's income from its principal source of revenue i.e. Lumpsum Premia and Royalty on the licensing of technologies to industry was Rs.380.40 lakhs, as compared to Rs.326.24 lakhs in the previous year. During the year 2005-06, the Corporation entered into Memorandum of Understanding/Agreement with the organisations like C-DAC, Thiruvananthapuram, Central Silk Board, Andhra Pradesh, State Sericulture Research & Development Institute, Hindupur, Gujarat University and M/s Tata Steel Ltd., Mumbai. As a result, 30 new processes were assigned to the Corporation for commercialisation as compared to 42 processes during the previous year. The Corporation signed 39 licence agreements during the year. Some of the major technologies licensed by the Corporation during the year are: Area specific mineral mixture to increase productivity of bovines, Vaccine for viral disease caused by pests des petits ruminants (PPR) incorporating vaccine strain, Foot and mouth disease vaccine for cattle, Coco lawn, Long shelf life paneer, Herbal ghee, A new silkworm bed disinfectant – ANKUSH, and Process for the manufacture of bio-release fertilizers of zinc-iron-manganese, iron-manganese copper and zinc-iron-manganese-copper. During the year,

the Corporation has collaborated with various Patent Offices in the country and organized 8 IPR awareness seminars on "Patents' Protection", Valuation & Commercialisation".

The Corporation has awarded various innovations in the key areas in the field of Agriculture, Biotechnology, Chemical & Allied, Electrical, Electronics, Mechanical, etc. It also announced cash awards amounting to Rs.11.65 lakhs for the new inventions on the occasion of Technology Day i.e. 11th May 2005. The Corporation also announced one WIPO Gold Medal for the best invention "An Area Specific Mineral Mixture to Increase Productivity of Bovines of Uttaranchal and Uttar Pradesh" to Dr. M. C. Sharma & Associates.

4.2 Central Electronics Limited (CEL)

Central Electronics Limited continues to hold top position among other public sector undertakings particularly in the field of SPV. During 2005-06, total exports of the company were Rs.23.98 Crores as against Rs.31.64 Crores in previous year. The major achievements of CEL during 2005-06 are i) completion of implementation of the project for upgradation and upscaling of Solar Photovoltaic operations to 10 MWp per annum by the end of 4th quarter ii) completion of the development of Multi Section Digital Axle Counter (MSDAC) and iii) Induction of Train Actuating Warning System (TAWS) at Level Crossing of Indian Railways.

The company earned foreign exchange worth Rs.20.40 Crores during the year 2005-06.