

## II A. INDUSTRIAL R&D PROMOTION PROGRAMME

### 1. OBJECTIVES

The broad objectives of the Industrial Research and Development Promotion Programme are to:

- ◆ Bring in-house R&D into sharper focus;
- ◆ Strengthen R&D infrastructure in industry and Scientific and Industrial Research Organisations (SIROs);
- ◆ Promote R&D initiatives of the industry and SIROs;
- ◆ Ensure that the contributions made by the in-house R&D centres and SIROs dovetail adequately in the overall context of technological and industrial development.

### 2. AREAS OF COVERAGE

The specific areas covered under the component scheme are:

- ◆ In-house R&D in Industry,
- ◆ Scientific and Industrial Research Organisations (SIROs), and
- ◆ Fiscal Incentives for Scientific Research

Activities and achievements in each of above areas are presented below:

### 3. IN-HOUSE R&D IN INDUSTRY

#### 3.1 Recognition of In-house R&D Units

A strong S&T infrastructure has been created in the country. This covers a chain of national laboratories, specialised R&D centres, various academic institutions and training centres, which

continuously provide expertise, technically trained manpower and technological support to the industry. Various policy measures have been introduced from time to time, to meet the changing industrial and technological requirements of the industry. The Government has been giving special attention to promotion and support to industrial research in industry. Several tax incentives have also been provided which encourage and make it financially attractive for industrial units to establish their own in-house R&D units.

A scheme for granting recognition to in-house R&D units in industry is operated by the DSIR. A number of incentives and support measures are made available to in-house R&D units. Ministry of Finance has issued notification amending the basic notifications under customs and excise. As per the amendments, all DSIR recognized in-house R&D units other than hospitals can avail customs and central excise duty exemption on their procurements for research purposes. Accordingly, all the eligible in-house R&D units recognized by DSIR have been issued certificates of registration during the year, to enable them to claim above benefits.

The in-house R&D units qualifying for recognition are expected to be engaged in research and development activities related to the line of business of the firm, such as, development of new technologies, design and engineering, process/product/design improvements, developing new methods of analysis and testing; research for increased efficiency in use of resources such as capital equipment, materials and energy; pollution control, effluent treatment and recycling of waste products.

The R&D activities are expected to be separate from routine activities of the firm, such as production and quality control. The in-house R&D units should have staff exclusively engaged in R&D and headed by a full-time R&D manager who would have direct access to the chief executive or to the board of directors depending upon the size of the unit. The in-house R&D units are also expected to maintain separate identifiable infrastructure and R&D accounts.

Number of in-house R&D units recognised by DSIR increased steadily from about 100 in 1973 to about 275 by 1975, to over 700 by 1980, around 925 by 1985, over 1,100 in 1990 over 1,200 in 1995 and thereafter is hovering between 1,200 to 1,250; 1,361 in March 2010; and 1618 in December 2011. Of these, nearly 1,480 are in the private sector and the remaining units are in public/joint sector. The last updated 'Directory of Recognised in-house R&D Units' was brought out as on 30<sup>th</sup> November, 2011. This Directory lists 1,378 recognised in-house R&D units, giving registration number, name and mailing address of the company, location of the in-house R&D unit(s) and validity of DSIR recognition. The Directory list for 2011 is being updated. The data on these R&D units has been computerised and updated.

For the purpose of recognition, the R&D units have to apply to DSIR as per a prescribed proforma. The proforma and other details about the scheme are provided to the interested companies on request. The proforma and details of the scheme are also available at DSIR website (<http://www.dsir.gov.in>). The applications received are scrutinised for their completeness in the DSIR and are then circulated for comments to various other departments/agencies such as concerned administrative ministries, MSME, CSIR, ICAR, ICMR, CCRAS, DBT, DCPC, DoT, DRDO, DIT, DoP and NRDC. The units seeking recognition are visited, if need be, by expert teams comprising of representatives of DSIR, as well as outside agencies, like, administrative ministries, CSIR, NRDC, DBT, ICAR, ICMR, DRDO, DIT, DoT, IITs and local educational and Research Institutions before they are taken up for consideration to verify their separation from the

commercial activities like production and quality control and services. In order to obtain first hand information on R&D activities of the applicant firms, discussions with the chiefs of the R&D unit and executives of the firm are also held in DSIR in many cases. During the discussions outside experts are invited and their comments are sought. The applications along with comments from outside agencies, visit reports, and the Department's own evaluation are considered by an Inter-Departmental Screening Committee constituted by the Secretary, DSIR. The Committee meets every month to consider the applications and makes recommendations to the Secretary, DSIR based on its evaluation of the R&D infrastructure and R&D activities of the applicant firms.

R&D recognition is considered on the basic requirement to avail fiscal incentives focused towards R&D and separation of R&D activities from commercial production/service activities of the company is considered important.

During the Calendar year under report, the Screening Committee met 12 times. Of the 434 applications received for recognition, the screening committee considered 409 applications. 323 R&D units were granted fresh recognition based on their satisfactory R&D Infrastructure, Qualified Manpower and Programmes; 86 applications were rejected and 91 applications are under process at the end of 31<sup>st</sup> December, 2011. A statement giving month-wise receipt, disposal and pendency of applications for recognition of in-house R&D units is given at **Annexure 1**.

During the period under report, more than 350 discussions/meetings were held with heads/representatives of in-house R&D units. Also, expert teams visited a number of in-house R&D units.

### **3.2 Renewal of Recognition**

Recognition to R&D units is granted for a period ranging from 1 to 3 year. The R&D units are advised to apply for renewal of recognition well in advance (3 months prior to the date of expiry of the recognition). Applications received for renewal

of recognition are circulated to CSIR, NRDC and/or the concerned administrative departments of Government of India for comments depending on requirement. The applications are examined in DSIR taking into account the inputs received from other agencies for taking suitable decision on their renewal. As of 1<sup>st</sup> April 2011, 368 in-house R&D units were due for renewal of recognition out of which 334 applications were received. Based on the evaluation of the performance of the R&D units, renewal of recognition was granted to 323 R&D units. Recognition granted to 11 companies could not be renewed because their R&D performance was not up to the mark. A statement showing month-wise receipt, disposal and pendency of the cases of renewal of recognition of the R&D units is given in **Annexure 2**.

### 3.3 Zonal Distribution of In-house R&D Units

The in-house R&D units are distributed throughout the country. There are around 229 units in the Northern Zone (Delhi, Haryana, Punjab, Uttar Pradesh, Jammu & Kashmir), around 200 units in Western Zone (Rajasthan and Gujarat), around 490 units in the Central Zone (Maharashtra, Madhya Pradesh and Orissa), around 509 units in the Southern Zone (Andhra Pradesh, Karnataka, Kerala and Tamil Nadu) and around 97 units in the Eastern Zone covering Bihar, West Bengal, Assam and other North-Eastern states and remaining 30 in other places.

### 3.4 R&D Expenditure

The expenditure incurred by in-house R&D units in industry has steadily increased. During 1980-81 it was of the order of ₹ 300 crores. In 1985-86, it was of the order of ₹ 500 crores. It is estimated that the present R&D expenditure of the 1,618 recognised R&D units is of the order of 10,000 crores. The share of public and joint sector is about 20 per cent and that of private sector about 80 per cent. Of these 1,555 recognised in-house R&D units, 181 spent over ₹ 500 lakhs each on R&D, 330 spent between ₹ 100 lakhs to ₹ 500 lakhs each per annum on R&D. The list of these R&D units is given in **Annexure 3 and 4** respectively.

### 3.5 R&D Infrastructure

The in-house R&D centres have created impressive infrastructural facilities for R&D including sophisticated testing facilities, laboratory equipment and pilot plant facilities. Analytical facilities such as HPLCs, HPTLC, FTIR, GCMS, Polymerase Chain Reaction (PCR) equipment, Hydrogenator, Stability Chamber, Aflatoxin analyzer, X-ray diffractometer, Salt Spray test chamber, Vickers hardness tester, IR/UV-VIS spectrophotometers, NMR spectrometers, electron microscopes, particle size analyzers, portable particle counting systems; vibration test equipment, calorimeter, ultra filtration equipment, sonicator, spectro fluorimeter, protein purification set up, digital viscometer, high temperature test and evaluation facilities, CAD-CAM facilities, rapid prototype building machines, greenhouse and tissue culture laboratory facilities are available with many in-house R&D units.

### 3.6 R&D Manpower

There has been a steady increase in R&D manpower employed by the in-house R&D units. By 1975-76, about 12,000 R&D personnel were employed by recognised in-house units, and by 1981-82, the figure was over 30,000. The present estimated manpower for the 1,618 in-house R&D units is around 85,000 out of which around 26,000 R&D personnel are employed in public sector in-house R&D units and around 59,000 R&D personnel are employed in the private sector in-house R&D units. Of the total 85,000 R&D personnel, around 8,500 are Ph.D's, 31,000 Post Graduates, 36,000 graduates and the rest are technicians and support staff.

### 3.7 Sectorwise Break-Up of In-house R&D Units

A broad sector-wise break-up of the recognised in-house R&D units is given in the following Table.

### 3.8 Achievements of In-house R&D Units

Some of the R&D achievements reported by the recognised in-house R&D units are listed below:

## Sector-wise Break-up of the recognised In-house R&amp;D Units

|  |     |
|--|-----|
| Chemical and Allied industries including Drugs, Pharmaceuticals and Biotechnology                | 594 |
| Electrical and Electronics industries  | 285 |
| Mechanical Engineering industries  | 193 |
| Processing industries (Metallurgical, Refractories, Paper, Cement, Ceramics, Leather and others) | 162 |
| Agro including Biotechnology and food processing industries and others                           | 142 |

## Physical and Biological Sciences

- Development of rapid, hand-held, and low cost reverse transcriptase LAMP- based genetic assay for Dengue fever
- Development of Injectable Nano-hydroxyapatite Scaffolds
- Development of rhu interferon alpha 2b process including scale-up and development of lyophilized formulation
- Development of Biliary and Esophageal Stents
- Development of novel, proprietary peptide Genopep 4 for inflammatory disease management
- Development of bacterial wilt & TYLC virus tolerant tomato hybrids
- Breeding of powdery mildew and thrips tolerant hot peppers
- Development of heat & rain tolerant marigold
- Development of tissue culture protocol for micro-propagation of Jatropha
- Development of protocol for viral indexing of in-vitro sugarcane and papaya cultures using DNA/ RNA based marker.
- Development of Non-migrating Non – bleeding pigments.
- Development of improved Ethoxylation process, so as to get consistent quality of fatty alcohol ethoxylates
- Development of a novel system for adsorbing and separating suspended gaseous impurities from effluent gases and thereby recovery of value added products
- Development of Efficient and single pot process for the preparation of enantiomerically

pure solifenacin succinate ; an antimuscarinic agent

- Development of process for Part replacement of asbestos fibers with alternate fibers in fiber cement sheets
- Development of process for Isolation of embelin as column chromatography from embelia ribes.
- Developing low sodium content fine grade hydrous clay suitable for the replacement of international grade hydrite in automotive paint formulation
- Development of fire fighting compositions for fighting fires of explosion in kitchens.
- Development of Low Alkali & Low Heat Belite Cement.
- Development of synthetic screw compressor oil.
- Development of process for Antioxidant concentrate from Rosemary
- Development of Modified method for development of functional ingredients fortified Rossomalai with rich sensory attributes and improved shelf- life.

## Electronics and ICT based Industries

- Development of Micro Controller Based Thyristor Charger
- Development of Radar-Processor module\* for IFF Radar.
- Development of DC ballasts
- Development of Lane Departure Warning System that automatically detects and warns when vehicle drifts outside lane.

- ◆ Development of Wheel aligner for automatic measurement of wheel parameters
- ◆ Development of high creepage solid core insulator
- ◆ Development of new material composition for Crimper and Anvil
- ◆ Development of Satellite Set Top Box
- ◆ Development of LED Head Lamp for Motorcycle
- ◆ Development of DPSH Capacitor with self healing properties for electronic ballast application.
- ◆ Development of Electrolyzer for ballast water treatment system
- ◆ Development of Thyristor Switch.

### Engineering Industries

- ◆ Development of Advent High End ICU Ventilator
- ◆ Development of Oil fire extinguishment powder
- ◆ Development of rotor blade model and mould for 850 kW Wind Turbine.
- ◆ Development of Carburetor for Suzuki slingshot motorcycle.
- ◆ Development of Track Link Castings for Excavator.
- ◆ Development of Penguin Passenger Vehicle
- ◆ Development of Tower Crane
- ◆ Designing and development of Machinery for mixing the firework raw materials
- ◆ Development of High Deck/ Low floor buses for Inter City and Intra City travels
- ◆ Development of Wireless plant control and Remote monitoring system
- ◆ Development of Autonomous Underwater Vehicle Battery
- ◆ Development of Armored vehicles against Mine protection
- ◆ Development of Ductile Iron (Grade 600 & 700) for Brakes System
- ◆ Development of Miniature Multi Output Power Module

### 3.9 Imports Made by In-house R&D Units

The recognised in-house R&D units have imported

a variety of equipment, raw materials and samples for their R&D activities. These include: HPTLC, FTIR, GCMS, Polymerase Chain Reaction(PCR) equipment, Hydrogenator, Stability Chamber, Aflatoxin analyzer, X-ray diffractometer, Salt Spray test chamber, Vickers hardness tester, Microplate reader, Medical photography equipment, Nitrogen generator, Abrasion loss testing machine, viscosity testing machine, Load cell, Universal testing machine, 30 ton capacity pully block , Ginning machine, Spares for Rota vapor chiller and extraction system, Polymer microscope, Oscillation granulator, Automatic potentiometric titrator, DSC (PerkinElmer), etc

### 3.10 Other Benefits Availed by the Recognised R&D Units

The Department provides assistance to recognised in-house R&D units in a number of ways, such as cases of industrial R&D units requiring allotment of special controlled materials for R&D, permission to export of specialised products reserved for small scale industries by medium scale industries for test marketing in other countries and disposal of imported R&D equipment/instruments and pilot plant produce are examined for making suitable recommendations to concerned agencies.

### 3.11 National Awards for Outstanding In-house R&D Achievements

In order to provide recognition to the efforts of industry towards innovative research and technological development, the National Awards for R&D Efforts in Industry were instituted by the Department of Scientific & Industrial research (DSIR) in 1987. These awards were presented along with citations at the inaugural session of the annual National Conference on in-house R&D in Industry organised every year. 177 companies have won the DSIR National Awards for Outstanding in-house R&D Achievements, so far.

DSIR National Awards for 2008 were presented to six companies on the 11<sup>th</sup> May, 2011, which is celebrated as Technology Day. The list of the award winners are as follows:

- ◆ Excise duty waiver on indigenous items purchased by approved institutions/ SIROs for R&D;
- ◆ Ten year tax holiday for commercial R&D companies approved upto 31.03.2007
- ◆ Excise duty waiver for 3 years on goods produced based on indigenously developed technologies and duly patented in any two of the countries out of India, European Union (one country), USA and Japan;
- ◆ Accelerated depreciation allowance on plant and machinery set-up based on indigenous technology;
- ◆ Customs duty exemption on imports for R&D projects supported by Government.

Information on some of these fiscal incentives is given in the following paragraph.

#### **5.1 Accelerated Depreciation Allowance on Plant and Machinery Setup Based on Indigenous Technology**

Secretary, DSIR, is the Prescribed Authority to certify expenditures where higher rate of depreciation is to be allowed for the plant and machinery installed for the manufacturing of products using indigenous know-how as per the provisions of rule 5(2) of IT Rules. Certificates are issued for eligible expenditure after a detailed examination in the department.

During the period under report, four certificates were issued to three companies by DSIR (Annexure- 6).

#### **5.2 Central Excise Duty Waiver for three years on patented products**

Central Excise Duty Exemption for a period of three years is available under Notification No. 13/99-CE dated 28<sup>th</sup> February, 1999 for specified goods provided the products are patented in any two countries from amongst India, United States of America, Japan and any one country of the European Union provided the products are designed, developed, patented and manufactured by a wholly Indian owned company, national

laboratory, public funded research institution, or university.

During the year certificate for claiming excise duty exemption under the notification was issued to M/s Delta Electrical Industries, Kolkata for LED night/ decorative and indicator lamps for patent on "A replaceable LED system".

#### **5.3 Reference on expenditure on scientific research under Section 35 (3) of Income-Tax Act, 1961.**

Section 35 (3) of Income-tax Act, 1961 provides that if a question arises as to whether and, if so, to what extent any activity constitutes or constituted or any asset is or was being used for scientific research, the Central Board of Direct Taxes would refer the question to the Prescribed Authority. Director General Income-tax (Exemptions) in concurrence with Secretary, DSIR is the Prescribed Authority for deciding such cases.

During the period under report recommendations of Secretary, DSIR were submitted to CBDT in the case of M/s Highway Cycles Ltd., Ludhiana, Punjab.

#### **5.4 Approval of Commercial R&D Companies**

In order to promote research and development activities in the commercial research and development companies, the Finance Act, 2000 provided for a ten-year tax exemption from income-tax under section 80-IB(8A) of the Income-tax Act, 1961, to approved companies, whose main objective is scientific and industrial research. Secretary, DSIR is the Prescribed Authority vide Gazette notification no. S.O.85 (E) dated 31 January, 2001, issued by Department of Revenue, Ministry of Finance for granting approval under section 80-IB(8A) of the IT Act. The notification was valid upto 31st March, 2007 and this scheme was not extended further by the Government.

The approval to commercial R&D companies is given initially for a period of 3 years, which can be extended up to 10 years based on evaluation of its performance.

The tax exemption is available to a company, which is accorded approval by the Prescribed Authority at any time after the 31st day of March 2000 but before the 1st day of April 2007.

Out of 45 companies approved till 31st March 2007, six companies are not availing benefit under the section at present. The list of 39 companies is given at Annexure 7.

### **5.5 Customs Duty Exemption to Recognised SIROs**

All SIROs recognised by DSIR other than hospitals are eligible for Customs Duty Exemption on the import of scientific equipment, instruments, spares, accessories as well as consumables for research and development activities and programmes.

The department was issuing the essentiality certificates to SIROs for obtaining the customs duty exemptions. As per the notification No. 24 /2007 dated 1<sup>st</sup> March, 2007 the Director or Head of the institute/organization is empowered to sign the essentiality certificate.

### **5.6 Central Excise Duty Exemption to Recognised SIROs**

All SIROs recognised by DSIR other than hospitals are eligible for Excise Duty Exemption on purchase of scientific and technical instruments, apparatus, equipment (including computers); accessories and spare parts thereof and consumables; computer software, Compact Disc - Read Only Memory (CD-ROM), recorded magnetic tapes, micro films, microfiches; and prototypes for research and development activities and programmes.

This provision was introduced by Ministry of Finance (Department of Revenue) vide notification No. 10/97-Central Excise dated 1<sup>st</sup> March, 1997. The department was issuing the essentiality certificates to SIROs for obtaining the central excise duty exemptions. As per the notification No.10/ 2007 dated 1<sup>st</sup> March, 2007 the Director or Head of the institute/organization is empowered to sign the essentiality certificate.

### **5.7 Customs and central excise duty exemption to Recognised in-house R&D units**

Ministry of Finance has issued notification no. 24/2007 – Customs dated 01/03/2007 and 16/2007 – Central Excise dated 01/03/2007 amending the basic notifications under customs and excise. As per the above amendments all DSIR recognized in-house R&D units other than hospitals can avail customs and central excise duty exemption on their procurements for research purposes. Secretary approved the issuance of certificate of registration to the recognized R&D units in June 2009 and at present all the eligible in-house R&D units recognized by DSIR have been issued the certificates of registration.

### **5.8 Registration of Public Funded Research Institutions, Universities etc.**

Public funded research institutions, universities, IITs, IISc., Bangalore; Regional Engineering Colleges (other than a hospital) are eligible for availing customs duty exemption on import of equipment, spares and accessories and consumables for research purposes through a simple registration with the DSIR. The heads of the public funded research institutions / organisations duly registered with DSIR can certify the R&D goods for duty free import as per the notification No. 51/96-Customs dated 23 July 1996. As per the Government notification No. 10/97-Central Excise dated 1.3.1997, the above Public Funded Research Institutions registered with DSIR are also eligible for Central Excise Duty Waiver on purchase of indigenously manufactured items for scientific research purposes.

Coinciding with the presentation of Union Budget for the year 2004, Ministry of Finance amended the notification No. 51/96-customs vide notification No. 28/2003-Customs dt. 1.3.2003. As per the amendment, departments & laboratories of central government and state governments (other than a hospital) are not required to register with DSIR for availing the customs duty exemption. They can clear the consignments by producing a certificate from the Head of the institution certifying that the said goods are required for research purposes only. Another significant change in the notification is that Regional

Cancer Centres have been included in the list of institutions eligible for DSIR registration for importing goods for research purposes at a concessional rate of customs duty.

For the purpose of registration, the PFRI/ Universities etc have to apply to DSIR as per prescribed proforma. The proforma and other details about registration scheme are available at DSIR website ([www.dsir.gov.in](http://www.dsir.gov.in)) The applications received are scrutinized for their completeness in DSIR by a Sub-Committee constituted by the competent authority. The complete applications are then considered by an Inter-departmental Screening Committee constituted by the department for considering the requests from various institutions. Presently the committee is chaired by a former Secretary of DSIR,

The Screening Committee met 1 time during the year 2011 and considered 19 applications received from various public funded research institutions.

During the year 2011, 23 registration certificates were issued to such public funded research institutions for availing customs duty exemption on import of scientific equipment, spares and accessories, consumable items and Central Excise Duty exemption on indigenous purchases for Scientific Research Purposes.

The registration to public funded research and other institutions mentioned in the notification is granted for maximum period of five years / ten year. The registered institutions are advised to apply for renewal of registration well in advance of the date of expiry of the registration.

During the year 2011, 249 institutions were due for renewal of registration. The department received 232 renewal applications. These were processed on individual files and approval of Competent Authority was obtained and 222 renewal certificates were issued. The remaining 9 applications are under process. On line submission

of application for registration / renewal of registration of Public Funded Research Institutions and others is under process.

#### **5.9 Approval of In-house R&D Centres under Section 35(2AB) of I.T. Act 1961**

In order to encourage R&D initiatives of industry, the finance bill 1997 introduced a sub section (2AB) in section 35 of the IT Act, 1961. The provision introduced initially was for select sectors of industry i.e. drugs, pharmaceuticals, electronic equipment, computers, telecommunication equipment, chemicals and provided weighted deduction of 125 per cent on expenditure on in-house research and development facility as approved by the prescribed authority i.e. Secretary, DSIR. Subsequently, a number of other sectors were added to the list of eligible sector. From the year 2009 the benefits have been extended to all sectors of industry with a select list of non-priority items. Rate of weighted tax deduction was raised from 125 per cent to 150 per cent subsequent to the year ending March, 2000. The rate of weighted tax deduction was further enhanced to 200% from 1<sup>st</sup> April 2010. Initially the provision was introduced up to 31<sup>st</sup> March, 2000. The provision was extended initially till 31<sup>st</sup> March, 2005 and then upto 31<sup>st</sup> March, 2007 and now the provision stands valid up to 31<sup>st</sup> March, 2012.

During the period under report, 187 new applications were received for approval under the provision. New approvals were accorded to 151 companies in Income Tax prescribed Form 3CM in addition to renewals to the companies already approved. Further, the detailed R&D expenditure of the approved companies were also examined and 108 reports valued at 3707 crores forwarded to DGIT (E) in Form 3CL as prescribed in IT Act. A list of companies approved under Section 35(2AB) of IT Act, during the year 2011 is furnished in **Annexure 8**.