No. 3(9)/2010-DPE (MoU)
Government of India
Ministry of Heavy Industries & Public Enterprises
Department of Public Enterprises

Public Enterprises Bhawan
Block No. 14, CGO Complex
Lodhi Road, New Delhi
Dated: 23rd September, 2011

OFFICE MEMORANDUM

Sub:Guidelines on (i) Research & Development and (ii) Sustainable Development for Central Public Sector Enterprises (CPSEs)

The undersigned is directed to enclose Guidelines on (i) Research & Development and (ii) Sustainable Development for Central Public Sector Enterprises. These Guidelines issue with the approval of Minister, Heavy Industries & Public Enterprises.

2. These Guidelines are available on DPE website http://dpemou.nic.in/MOUFiles/R&D.pdf and http://dpemou.nic.in/MOUFiles/Sustainable_Dev.pdf.

3. CPSEs are requested to implement these Guidelines with immediate effect. However, for the purpose of Performance Evaluation under the MoU system, these Guidelines will take effect from the year 2012-13.

4. All the administrative Ministries/Departments are requested to take note of the above Guidelines and bring these Guidelines to the notice of CPSEs under their control for necessary action.

23.09.2011

(J.R. Panigrahi)
Director (MoU)
Tel.24360841

Encl: as above

To:
1. Secretaries of all administrative Ministries/Departments
2. Chief Executives of all CPSEs

GUIDELINES

ON

RESEARCH & DEVELOPMENT (R&D)

FOR

CENTRAL PUBLIC SECTOR ENTERPRISES

Department of Public Enterprises

Ministry of Heavy Industries & Public Enterprises

INDEX

1. RATIONALE

1.1 The ongoing integration of world economies has opened up an array of business opportunities and challenges to corporate firms to access new markets on the one hand and increased competition on the other. This intense competition is pushing business leaders to increasingly recognize the need to shift focus to new business opportunities. The situation has also compelled organisations in the developed world to make their operations R&D driven as they increasingly confront the risks of competing with low cost producers in emerging markets.

1.2 Despite substantial achievements and high levels of performance in a large number of sectors, our country has not optimally utilized its vast research potential. It urgently needs to strengthen its enormous capacity to generate knowledge and to translate that knowledge into economic and social value.

1.3 At the time of independence, our nation did not have a strong, organized scientific or technological infrastructure and it had to depend heavily upon imported technologies for development. India's Science and Technology Policy, 2003 aimed at optimal utilization of existing physical and knowledge resources, development of innovative technologies, creation and management of intellectual property, systems and methodologies for mitigation and management of natural hazards, etc. Over the years, our country has developed a large base of scientific manpower with the expertise to facilitate and promote modern advancements in basic and applied sciences. The time is therefore, ripe to focus on R&D for accelerating development and growth in the country.

1.4 R&D plays an important role in the business processes that result in technology bringing new products and services to the market place. R&D results in high quality jobs, successful enterprises, better goods, services and more efficient and cost effective processes.

1.5 As per the Research and Development Statistics 2007-08 published by the Ministry of Science and Technology, India's R&D expenditure as a percentage of GNP in 2005-06 was 0.89% as compared to 0.81% in 2002-03. The share of various sectors in the National R&D expenditure for the year 2005-06 was: Central Govt. 57.5%, Public sector industry 4.5%, Private sector 25.9%, State Govt. 7.7% and Higher Education 4.4%.

1.6 The rationale behind R&D activities for CPSE's is the changed business environment is highly competitive markets, the rapid pace of change in technology, stringent emission norms, quality control criteria, heightened expectations and demands of customers, lack of transfer of technology and know-how from competitors, etc. R&D activities by CPSEs can result in substantial increases in market share and competitiveness. They would help to increase profitability and reduce costs. R&D is also a vital input for strengthening the defence preparedness of our nation.

1.7 R&D initiatives can further help strengthen our country's technological capabilities, ensure growth and help in the creation of jobs. They would also allow CPSEs to address the new challenges and opportunities in increasingly competitive global markets. R&D programs will create opportunities for the young and educated youth and will help in retaining talent within the country. Focused R&D programs, combined with new international partnerships, can help to address global issues such as climate change, health, energy security, food security and poverty alleviation.

1.8 In MoUs to be signed between CPSEs and administrative Ministries/Departments from the year 2011-12 onwards, 5% weightage out of 50% for non-financial parameters has been earmarked for R&D activities.

1.9 Some R&D activities carried out by CPSEs so far, are in the area of :

- Technology development
- Product development / improvement
- Process development / improvement
- Efficiency improvement
- Performance improvement
- Quality improvement
- Value engineering
- Cost reduction
- Import substitution for strategic reasons
- Ecological Balance, conserving environment & resource optimization
- Developing alternate sources of energy
- Providing solutions to generic problems (non-routine)

2. SCOPE & MEANING

2.1 According to the Companies Act 1956, the accounts of the companies are required to be prepared in accordance with the Accounting Standard issued by the Institute of Chartered Accountants of India from time to time. The accountings of Research and Development expenses have been dealt with under the Indian Accounting Standard 26. According to this, '*Research' is original and planned investigation undertaken with the prospect of gaining new scientific or technical knowledge and understanding.'*

Examples of research activities are (Reference to Institute of Chartered Accountants, Accounting Standard - 26; page 42):

a) *activities aimed at obtaining new knowledge;*

b) *the search for, evaluation and final selection of, applications of research findings or other knowledge;*

c) *the search for alternatives for materials, devices, products, processes, systems or services; and*

d) *the formulation, design, evaluation and final selection of possible alternatives for new or improved materials, devices, products, processes, systems or services*

2.2 Further, according to Accounting Standard 26, 'Development' is *the application of research findings or other knowledge to a plan or design for the production of new or substantially improved materials, devices, products, processes, systems or services prior to the commencement of commercial production or use'.*

Examples of development activities are (Ref ICAI, AS 26 Page 46):

a. *the design, construction and testing of pre-production or pre-use prototypes and models;*

b. *the design of tools, jigs, moulds and dies involving new technology;*

c. *the design, construction and operation of a pilot plant that is not of a scale economically feasible for commercial production;*

d. *the design, construction and testing of a chosen alternative for new or improved materials, devices, products, processes, systems or services; and*

e. *the design, construction and operation of a demonstration plant of reasonable capacity for proving the technology at commercial scale.*

2.3 Moreover, the Govt. of India has enunciated various fiscal incentives to promote R&D activities. Deductions for R&D expenses are allowed under the Income Tax Act.

2.4 According to the proposed Direct Tax Code Bill 2009, '*Scientific Research and Development' shall mean systematic investigation and search in the field of technology natural or applied science (including agriculture) if :*

a) It is carried out by a Company by means of experiment or analysis;

b) It is in the nature of:

(i) Basic research, namely work undertaken for the advancement of scientific knowledge without a specific practical application in view,

(ii) Applied research, namely work undertaken for advancement of scientific knowledge with a specific practical application in view,

(iii) Experimental development, namely, work undertaken for the purpose of achieving technological advancement for the purpose of creating new or improving existing materials, devices, products or processes including incremental improvement thereof and

c) *It is **NOT** in the nature of*

(i) *Market research or sales promotion, or*

(ii) *Quality control or routine testing of materials, devices, product or process or processes, or*

(iii) *Research in the social science or the humanities, or*

(iv) *Prospecting, exploring or drilling for, or producing, minerals, petroleum, or natural gas, or*

(v) *The commercial production of a new or improved material, device or product or commercial use of new or improved process*

(vi) *Style change, or*

(vii) *Routine data collection*

2.5 Notwithstanding the definitions mentioned in the above paras, for the purposes of MoU, the following activities in addition to activities mentioned in para 1.9 shall also fall within the ambit of R&D activities and may include any one or more of the following that may be relevant to the current & future business needs of the organisation. (Indicative list is given at Annexure-I)

a) R&D activities must be original and planned and should result in new knowledge;

b) The application of R&D should result in new / improved products or processes or services that should be new to the company, or new to the region or new to the world;

c) The search for knowledge may be related to product, material, device, process, system or services. It may be related to design, or new or alternative or improved use of materials, products, processes, systems or services;

It also includes application of research findings for new or substantially improved materials, products, processes or systems or services prior to commencement of commercial production or use which may include

d) setting up of demonstration / pilot plants for the first time by the organization;

e) Sectors, like Financial, Tourism, Trading etc., can take-up the design and testing of new or improved systems or services to develop new processes resulting in enhanced value addition / performance of the organization.

3. POLICY, PLANNING AND BUDGETING

3.1. The Planning for R&D should commence with the Corporate R&D Policy of the company which every CPSE must have. This Corporate R&D Policy should align itself with the Company's Vision and Mission.

3.2. Based on the R&D Policy, the CPSE must develop an R&D manual and Specific R&D plan. Specific R&D plans should be long, medium and short term as per need and have clearly earmarked objectives, scope, expenditure, benefits expected, deliverables, time periods etc. It may also include details of expected tax benefits. To achieve the objectives and goals, it is necessary to prioritize R&D projects depending on the benefits that are likely to accrue.

3.3. CPSEs shall get Specific R&D plan and R&D budget approved by the Board of Directors and the details of such approval are required to be submitted to the Task Force at appropriate time. Any CPSE which has not got its Specific R&D plan and R&D budget passed by its Board will automatically be rated as "Poor" in R&D component of MoU.

3.4. Specific R&D plans should also contain details about implementation as well as procedures and methodologies for monitoring results and modalities of concurrent and final evaluation. It should also specify mandatory documentation of the R&D efforts as well as results achieved. It should also, where applicable, include provisions for obtaining / maintaining recognition of its R&D centre by the Department of Scientific & Industrial Research, so that applicable tax / duty benefits can be claimed by CPSEs.

3.5. Specific R&D plans should contain projects to be undertaken. The targets to be achieved against each project needs to be clearly defined. The plan should specify :

- Projects to be undertaken;
- Activities to be undertaken for each project;
- Budget allocated as a percentage of PAT;
- Responsibilities and authorities;
- Major measurable and perceivable results expected;
- Knowledge management systems and HR issues of manpower, incentives and rewards;
- Proposed net working with academic/research institutions, customers and vendors.

3.6. Projects labelled as R&D should not overlap with projects under Corporate Social Responsibility or Sustainable Development.

3.7. CPSEs should formulate a procedure for identifying in-house / collaborative R&D projects.

3.8. **Funding of R&D:**

i) The CPSE must specify and justify its R&D budget as a percentage of Profit (PAT) keeping in mind its long term business needs and current expenditure on R&D. The expenditure on R&D as a percentage of PAT will have 50% weight in the total marks of 5 in the MoU. The prescribed minimum amount for expenditure under R&D will be as under :

Sl. No.	Category of CPSE	Minimum Expenditure on R&D as a percentage of PAT
1	Maharatna & Navratna	1% of Profit after Tax
2	Miniratna –I & II and below	0.5% of Profit after Tax

ii) CPSE should make an attempt to benchmark R&D spending with internationally prevalent best practices in that sector.

iii) R&D budgeting for the next 3 years must be clearly indicated. However, the projected annual expenditure for the year under consideration will be taken as the target for the year.

iv) The funding of R&D budget will not lapse. It will be transferred to a R&D fund which will accumulate –as in the case of non lapsable pool for the North East.

v) In respect of CPSEs categorised under Section 25 and Financial Services syndicates, etc., DPE / Task Force will have the flexibility to evolve parameters, weights, etc. for R&D.

3.9. CPSEs should empower R&D team with adequate delegation of powers for smooth implementation of projects. The R&D Project leader may be empowered to procure materials / components / equipment / software tools from foreign sources as per established procedures or as decided by the Board of CPSE. Similarly, if the R&D team finds it essential to consult an expert individual / agency / institute after ensuring availability of the resource for desired results, the team may be empowered to hire such services / competencies as per established procedures. or as decided by the Board of CPSE. The R&D team should be empowered to travel and interact with peers on need basis. Visits to foreign universities, technical conferences for interaction / collaborative association may be simplified / streamlined / facilitated.

3.10. CPSEs have been classified into Maharatna, Navratna , Miniratna I& II and other category. Maharatna and Navratna CPSEs shall select Five R&D projects ; Miniratna I&II and other CPSEs shall select Three R&D Projects to be taken as Target in the MoU.

4. IMPLEMENTATION

4.1. R&D must be developed as a 'discipline' in CPSEs through a systematic approach.

4.2. CPSE should create a mechanism / process for planning / monitoring at the apex level to decide on R&D activities on long term / short term basis. The mechanism should ensure periodic assessment of the progress of the activities. In addition, the Board may appoint / assign a Director or its Sub-committee who can meet on regular intervals to review the progress with the R&D team.

4.3. The implementation of an R&D project may be based on the following procedure:

4.3.1 Stable & Permanent Mechanism

A mechanism / process should be created to decide the procedures for taking up R&D activities / projects along with other parameters such as: cost, benefits expected, time period (on long term/short term) etc. The mechanism for the implementation of R&D shall be constituted in the beginning of the project. The project initiation format shall contain:

- Project description, outcome, work plan and milestones along with the time schedule
- Project team, possible partnerships & collaborations
- Procurement plan for equipment, pilot plant, software etc
- Infrastructure, financial and manpower requirements
- Empowerment of the R&D team required to take crucial decisions
- Identification of grey / critical areas and plan to overcome the same

4.3.2 Baseline Organizational Survey

The impact made by R&D activities should be quantified to the best possible extent with reference to baseline data which needs to be developed by the CPSE before the start of the project. The baseline data should have information on previous work done and technologies available in similar areas.

4.3.3 Project Identification

R&D project selection and funding decisions are critical if the organization is to stay in business as any wrong decision can result in the tying up of significant resources and lead to loss of both strategic and market position. In the fast changing business environment prevailing today, R&D is an investment which companies make for their future growth and sustained operation.

Thus, R&D projects should be identified keeping in mind the business needs of the CPSE. Wherever possible, the project selected should be in-line with the core activities and the outcome of the R&D should help in achieving the long term goals of the CPSE and should yield measurable economic / social benefits. In other words, the R&D project selected should be within the framework of an enterprise's strategic objectives and organizational structure while considering and integrating financial and strategic benefits of each project.

4.3.4 Specifying outcomes

The outcome expected at the end of the project should be clearly defined before the start of the project as it would help to understand and communicate to others how the projects and services will contribute to the broader and more enduring goals of an organisation. However, it need not describe a program or strategy in any real sense. Outcome is not about actions or activities, but is about the results of actions and activities.

Writing outcomes is often best handled as a group exercise among the team of people to be involved in the planning, implementation, and management of a program. This allows various stakeholders to come together and weigh the various viewpoints and perspectives.

4.3.5 Setting Timeline & Mileposts

Timelines & Mileposts are tools that could be used to help team members to know what tasks need to be achieved at each phase of the project and under what time schedule. Preparing a graphical representation is an appropriate way to provide an overview of all that needs to be accomplished in a project as well as how much time it will take to be completed.

4.3.6 Collaboration & Synergizing

Activities may be undertaken by CPSEs individually as in-house activities in its R&D Centre. Alternatively, R&D activities may be undertaken/outsourced through specialized agencies like Universities, Central organizations, i.e., CSIR, ICAR, ICMR, DRDO, DoS, DAE and other National & International Laboratories / academic institutions, Private Companies, Labs or Institutions. Collaboration may also be taken up for the in-house project amongst different departments in the organization if the requirement so arise.

For the state- of- the- art technologies for which technology base and expertise is not available in the country, CPSE should explore collaboration with the best foreign universities, research labs / institutions so as to compress the technology development cycle.

4.3.7 Outsourcing

The purpose of R&D outsourcing is to bridge the gap in competencies / resources required for businesses with differentiated products and systems to

meet market needs. Outsourcing of essential competencies for meeting R&D project activities / objectives should be need based. The team shall be empowered to identify and utilise all such resources. CPSEs who do not have R&D facilities, can outsource R&D work as part of overall product development.

4.3.8 Incentives and Rewards

The incentives introduced by the Government of India to promote R&D include: write off of revenue and capital expenditure on R&D, weighted tax deduction on sponsored research programmes of industry with National Laboratories / Universities / IITs; accelerated depreciation allowance on plant and machinery which are set up based on indigenous technology, custom duty exemption on goods imported for use in Government funded R&D projects, excise duty waiver for 3 years on goods produced based on indigenous technologies and duly patented in any two countries out of India, European Union (One Country), USA and Japan.

Timely and successful completion of a project could be considered for incentives and rewards. The team leader and the members should be considered for citations and cash awards. CPSEs should formulate schemes for giving incentives to scientists and engineers for outstanding R&D activities, like IPR - Patent filing, Publications, Commercialization of R&D process/patent/know-how, etc.

4.3.9 Exemption

Notwithstanding anything contained in these Guidelines, CPSEs which genuinely feel that investment in R& D would be unnecessary for them, may make a written submission to their Task Force Syndicate Convener. Only on receipt of a written exemption duly signed by such Convener would a profit making CPSE be allowed to forego R& D activities. Such an exemption would be valid only for one performance year.

Loss making CPSEs, sick CPSEs, CPSEs under BRPSE package and CPSEs registered under Section 25 of the Companies Act are automatically exempted from these Guidelines. However, they should achieve R&D objectives by integrating business processes with R&D processes to achieve quality improvement, energy efficiency, cost reduction, development of new products, improvement in products and processes, etc. Wherever possible, they may take initiative in synergy with other CPSEs or Research Institutions / Agencies / Laboratories / Universities.

5. MONITORING

5.1. A close review and monitoring of the R&D projects is very crucial and needs to be a periodic activity of the Enterprise. For proper and periodic monitoring of R&D activities, CPSEs may appoint a Sub-committee of the Board or a suitable apex group.

5.2 The R&D projects undertaken by CPSEs shall be monitored and reviewed at regular intervals (monthly / quarterly / annually). The review of the project shall be done with respect to the target set at the beginning of the project. The project report submitted for the review shall contain both physical and financial progress of the project. This will not only help in getting a valuable feedback, but will also help in determining whether a particular project should be continued or may be abandoned.

5.3 Types of Review may be concurrent or final, based on the activity chart of the project &its completion time. This may include:

Concurrent Review which may cover:

a) Activities with-respect-to deliverables / Milestones

b) Need for any course change

c) Need for financial or networking modifications

d) IPR feasibility

Final Review which may cover:

a) Deliverables as anticipated

b) Reasons for short closure or change of course

c) Reasons for change in budgeted expenses

d) Adherence to time schedule

e) Possibility of IPR

5.4 CPSEs may develop their own systems / procedures for review which may be multi-tiered, if needed.

5.5 CPSEs should have a separate paragraph / chapter in the Annual Report on the implementation of R&D activities/projects, including the facts relating to physical and financial progress.

5.6 Results of R&D activities should be recorded and reasons for failure of a project must be analysed and recorded so that the same may be used as a reference in future.

6. FILLING UP TARGET SETTING CUM EVALUATION TEMPLATE AND MARK/WEIGHT ALLOTMENT PROCEDURE FOR MOU

6.1 Each CPSE would be evaluated under the MoU framework for its achievement in the area of R&D.

6.2 For this purpose, each CPSE would be required to select R&D projects (Maharatna & Navratna - Five Projects, Miniratna - I&II and other CPSEs below– Three Projects: Illustrative list of projects given at Annexure- I) at the time of submission of draft MoU to the Task Force.

6.3 CPSE's actual performance vis-à-vis MoU targets on R& D will be evaluated on the basis of the following:

a) R&D expenses incurred and
b) progress made in respect of chosen projects

6.4 CPSE will submit the requisite information on R& D in the prescribed Target Setting cum Evaluation Template given at Annexure-III at the time of:

(i) Submission of draft MoU to the Task Force Syndicate and

(ii) Submission of self-evaluation report on or before 31st August each year i.e. just before MoU Performance Evaluation by the Task Force

<u>During Submission of Draft MoU</u>

At the time of submission of draft MoU, CPSE is required to submit the details of approval of Specific R&D Plan and R& D Budget by Board of Directors; the Projected Annual Expenditure on R&D on a five- point scale (Excellent, Very Good, Good, Fair and Poor) (Table 1) ; Chosen R& D Projects (Maharatna & Navratna -Five Projects, Miniratna -I&II and other CPSEs below– Three

Projects) along with one performance indicator for each and performance target values on a five- point scale(Excellent, Very Good, Good, Fair and Poor) (Table 2).

During Submission of Performance Evaluation Report

CPSE is required to submit Total Expenditure incurred on R&D and its percentage of Profit after Tax (Table 1); actual performance achievement as compared to target value in respect of performance indicator for each chosen projects (Table 2) on or before 31st August every year. In case the details of approval of Specific R&D Plan and R&D Budget by the Board of Director are not submitted, "Poor" grade will be awarded at the time of evaluation of MoU. **CPSE is not required to fill up the Score allotted for each Table as the Task Force, on consideration of actual achievement verified by Independent Expert or Research Advisory Committee of CPSE, will allot the marks on R&D during evaluation of the MoU.**

6.5 Target Setting cum Evaluation Template consists of 2 Tables, details of which are as under:

6.5.1 **Table 1: Mandatory Parameter- R& D Budget as a percentage of PAT-** Each CPSE shall indicate proposed R& D budget as a percentage of Profit after Tax (PAT) of the previous year (Refer clause 3.8 of Guidelines) at the time of submission of draft MoU. It will have a weightage of 2.5 out of 5 on R& D in the MoU.

With a view to distinguishing "Excellent Performance" from "Poor Performance", five different performance targets on a five-point scale (Excellent, Very Good, Good, Fair and Poor) shall be fixed in the MoU.

At the end of the year, during performance evaluation of MoU, CPSE shall indicate actual expenditure incurred on R&D, as a percentage of Profit after Tax (PAT). This should be verified by an Independent Expert or the R&D Advisory Committee.

6.5.2 **Table-2: Projects Chosen by CPSE-**

Stage-1: Each CPSE shall submit R&D projects (Maharatna & Navratna -Five Projects, Miniratna- I&II and other CPSEs below– Three Projects :- Illustrative list of projects given at Annexure- I) at the time of submission of draft MoU to the Task Force.

Each CPSE is required to indicate one performance indicator (illustrative list given at Annexure- II), which it considers to be the most important/vital /key indicator for each project, at the time of submission of draft MoU.

CPSEs shall assign due weightage to each project at the time of submission of draft MoU. Total weightage for projects chosen will be 2.5 out of 5 on R&D in MoU.

Stage 2: During the negotiation meeting, Task Force will discuss R&D Projects and key performance indicators. With a view to distinguishing "Excellent Performance" from "Poor Performance", five different performance targets on a five-point scale (Excellent, Very Good, Good, Fair and Poor) shall be fixed in the MoU. The Task Force can add/delete/modify the R&D Projects, performance indicators, target values and weights.

After deliberations during the negotiation meetings, such projects along with target values against performance indicator(s) and weights as approved by the Task Force shall be incorporated in the MoU. However, a CPSE can substitute only one project out of those agreed in MoU provided a notice indicating the intention to substitute the same is given to the Task Force member In-charge of R&D, three months before the start of the project.

6.6 **Assessment of R& D in MoU**

At the year end, each CPSE shall submit Self- Evaluation Report on R& D performance in respect of:

(i) Actual expenses on R& D as against agreed target and as a percentage of PAT (Table 1),

(ii) Actual achievements/milestones in respect of each R& D project/activity agreed in MoU target (Table 2).

Such Self-Evaluation Report of each CPSE shall be duly supported by a verification report of Independent Expert or R&D Advisory Committee.

6.7 Each CPSE shall submit the evaluation report to DPE after approval of the Board of Directors and through the Administrative Ministry. The Task Force, after due scrutiny, will award the final score out of 5 on Research & Development.

7. DOCUMENTATION, ADVOCACY, PROMOTION AND DEVELOPMENT

7.1 **National R&D Hub**:

The Department of Public Enterprises in conjunction with National Foundation for Corporate Social Responsibility under the Indian Council of Corporate Affairs, Ministry of Corporate Affairs and the CPSEs, will create a National R&D Hub which will undertake / facilitate the following activities:

i. Nation-wide compilation, documentation, and creation of database of R&D projects/activities and initiatives of CPSEs;

ii. Advocacy;

iii. Research;

iv. Preparation of Panels of Implementing organizations, monitoring and evaluation agencies;

v. Promotional activities, including production of short films, printing of brochures, pamphlets, promotional materials etc.;

vi. National and International Conferences, Seminars, Workshops,etc. ;

vii. undertake /coordinate training activities connected with R&D

viii. Think Tanking and collaboration with external agencies to create a R&D Think Tank;

ix. Setting up a National Data Centre;

x. Any other activities that it deems fit for the promotion of R&D ;

xi. Any other matter as entrusted to it from time to time by the Department of Public Enterprises (DPE).

7.2 The National R&D Hub will begin operations with funding provided by Department of Public Enterprise. It will, however, be free to receive fund from:

i) SCOPE and both Central as well as State PSEs;

ii) UN agencies, reputed international agencies such as World Bank, EU and other multilateral bodies and organisations;

iii) Reputed National and State Bodies,

iv) Government Departments, Autonomous Organisations, Planning Commission, Attached and Subordinate Office, Corporation etc.

7.3 It may consider setting up a corpus fund.

7.4 The CPSEs shall ensure that every R&D project /activity to be undertaken by them shall be communicated and listed in the central data base created by HUB. Only project/activity that appear in the data base of HUB will be allotted mark during evaluation of the MoU. .

7.5 Forum for Knowledge Sharing

CPSE may share the experience of R&D with other related CPSEs. Efforts may be made to conduct R&D conferences / meets of all CPSEs on an annual basis to share the experience and knowledge gained through R&D. The R&D hub can act as information repository of past and current efforts of CPSEs, a platform for sharing of experience and best practices and a forum to foster collaboration among CPSEs, and with academic institutions.

7.6 Assimilation & Usage of results

A "detailed technical report" shall be compiled by the project team. The report shall be approved by head of the unit for its contents and accuracy. The report shall be discussed with the end user (the manufacturing counterpart) for implementation. The organisation shall synchronize utilisation of the R&D results by arranging suitable infrastructure at its manufacturing plant. The report, IPRs in soft form shall be available and securely archived in CPSE's Knowledge Management portal.

7.7 Propagation and Promotion

Effective Propagation and Promotion of R&D would result in improved exchange of information between the research and development community and the rest of society.

The outcome of R&D projects may be published in various journals and presented in National & International seminars / conferences / workshops for its commercial exploitation. Advertisement in the media may also be considered depending on the type of project. The Scientists and Engineers of R&D Dept. must be encouraged to participate and present technical papers in National & International conferences / seminars / workshops.

Commercial use is the main idea for popularisation of the R&D results, as this will evoke the interest of new partners and increase the attention of the entire public for science and technology via outputs in the media, exhibitions, conferences, publications, etc.

Meticulous documentation of R&D approaches, policies, activities/ programmes, expenditures, procurement etc. should be done and put in the public domain(particularly through the internet) and made available to the National Hub for propagation and promotion.

7.8 These Guidelines may be amended by the Department of Public Enterprises from time to time with the approval of the competent authority.

8. CHECKLIST FOR EVALUATION

Checklist	
☐	Project Reference (ID)
☐	Title
☐	Start Date
☐	End Date Proposed
☐	Last Evaluation Date
☐	Objectives, benefits and deliverables
☐	Background & Description of the Project with list of activities
☐	Baseline Survey
☐	Timeline & Mileposts
☐	Action Plan
☐	Target achieved
☐	Collaborations, if any
☐	Detailed documentation on the project
☐	Resources employed in terms of manpower & infrastructure
☐	Budget absolute and as % of PAT
☐	Expenditure incurred and estimated for the remaining period
☐	Beneficiaries
☐	Impact
☐	Status
☐	Outcome in terms of IPR filed, papers published etc.
☐	Evaluation report by an independent agency

ANNEXURE-I

Illustrative list of R&D activities for different Syndicates

Crude Oil Gas & Petroleum:

- Advanced fuels and lubricants.
- Fuel and Lube additives.
- Catalyst.
- Catalysts for Petrochemicals.
  - Hydrogenation and dehydrogenation.
  - Alkylation and De-alkylation.
  - Oxidation catalysts.
- Adsorbents for separation and purification processes.
- Polyolefin Catalysts.
- Reactive Extrusion of Polymers.
- Polymer Material Science.
- Degradation and Stabilization of Polymers.
- Degradable / Biodegradable Polymers.
- Refinery Processes.
- Modelling and simulation.
- Biotechnology & Bioremediation of Petroleum and Oil Spills.
- Bio-fuels & alternative fuels and energy devices.
- Development of lubricants based on nano particles.
- Crude Transportation and Blend Compatibility studies.
- Bitumen Development & Resid Upgradation.
- Chemical/ Physical analysis.
- Petrochemical integration.
- Hydrocarbon Exploration & Production (Upstream E & P).
  - Seismic processing, interpretation, Petroleum system modelling.
  - Reservoir characterization, oil & gas field development.

- Enhanced oil recovery, well productivity enhancement.
- Development of drilling, drilling fluid & cementing technology.
- Oil and gas production and processing.
- Formation evaluation & field studies.
- Unconventional resource exploration & exploitation.

Power Generation & Transmission:

- Alternate and New & Renewable Energy Sources.
- Climate Change Issues, waste management/recycling and water management/conservation.
- Efficiency Improvement & Cost Reduction.
- Improving availability, reliability & safety of man & machines of the plants.
- Studies related to solutions to chronic problems of the plants.
- Energy conservation.
- Product development, Material development, Process modifications / development.
- Reduction in Environmental impact with introduction of new technology like:
    - GIS (Reduced Space Requirement)
    - HVDC (Reduced ROW for each MW flow)
    - 1200KV (Reduced ROW for each MW flow)
- Improving transmission system efficiency.
- Increasing Equipment Life.
- Progressively optimizing land use.
- Development of monitoring & diagnostic techniques.

Transport, Tourism & Financial Services:

- Reduction of emissions.
- Waste management.
- Relieving Urban congestion & reduction of noise level.
- Intelligent transport systems and automated freight transport.

- Safety.
- Inventory Management.
- Performance based navigation system.
- New improved financial instruments.

Agriculture, Chemicals, Fertilizers and Pharma:

- Introducing Biotechnology in shortening the time needed to obtain biological products, which would result in reducing the cost and better yield.
- Increasing shelf life and reduction in time for taking the products to the consumer.
- Better storage facilities.
- Effective, environment- friendly pest control services.
- Developing alternatives for Chemical Pesticides and Fertilizers.
- Promoting slow Release Fertilisers.

Electronics, Telecommunication & IT:

- Increasing communication efficiency through advanced fiber optic related research.
- Developing innovations in the semiconductor industry to allow for faster, smaller, and smarter chips.
- Innovative ICT solutions for sustainable healthcare.
- Innovative ICT solutions for energy efficiency: Dynamic pricing in the utility grid requires new electronic trading platforms. Power quality management
- Demands new decentralised monitoring and control systems and smart metering.
- Developing electronic identity management (eID) infrastructure and trustworthy services in e-government and e-commerce.
- Improving and refining Equipments, Technologies for Defence / Security: Equipments for detection of Air / Surface /Subsurface targets viz. Radars,

Sonars, Command and Control Systems, Communication Systems with ECCM features, EW equipments, Day / Night vision Equipments etc,

Engineering, Transport Equipment & Consumer Goods:

- New / Alternative / Improved products,
- New / Alternative / Improved process or systems,
- New / Alternative material or equipment to be used,
- Waste management,
- Environment control,
- Stringent quality control requirements of the customers.

Steel, Minerals & Metals:

- Development of technology for removing impurities / reducing cost.
- Utilisation of fly ash.
- Utilisation of low grade minerals / ores & wastes.
- Carbon freeze sponge iron products.
- Improving energy efficiency of furnaces and waste heat utilisation.
- Process up-gradation, improvements, new product / process and new analytical techniques development.

Trading & Marketing:

- Development of new processes to reduce the cycle time / response time.
- New methods of preservation.

Contracts & Consultancy:

- Development of software to monitor timely completion of projects,
- Use of time & energy saving devices / machines,
- Inventory management,
- Developing inputs from six sigma analysis for improving processes,
- Environment management.

Any other R& D project acceptable to Task Force

Sonars, Command and Control Systems, Communication Systems with ECCM features, EW equipments, Day / Night vision Equipments etc,

Engineering, Transport Equipment & Consumer Goods:

- New / Alternative / Improved products,
- New / Alternative / Improved process or systems,
- New / Alternative material or equipment to be used,
- Waste management,
- Environment control,
- Stringent quality control requirements of the customers.

Steel, Minerals & Metals:

- Development of technology for removing impurities / reducing cost.
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Contracts & Consultancy:

- Development of software to monitor timely completion of projects,
- Use of time & energy saving devices / machines,
- Inventory management,
- Developing inputs from six sigma analysis for improving processes,
- Environment management.

Any other R& D project acceptable to Task Force

ANNEXURE-II

Illustrative list Of Project Based Performance Indicators:

For each R&D Project, performance indicator is to be identified, monitored and measured to gauge actual performance of project vis –a vis the planned performance. Illustrative list of performance indicators are as under:

1. Projected expenses vis-à-vis budget
2. Sponsored research by a CPSE or by a consortium (Oil, Power)- Expenses on sponsored research vis-à-vis benefit derived
3. Commercialization of R&D
4. Improvement in Efficiency
5. New sales generated vis-à-vis Cost incurred on R&D
6. Market share increase due to introduction of new or improved product
7. Additional profit generated vis-à-vis Cost incurred on R&D
8. Cost savings realized vis-à-vis Cost incurred on R&D
9. Productivity improvements introduced vis-à-vis Cost incurred on R&D
10. Number of technologies transferred / acquired
11. Reduce environmental Impact
12. Milestones achieved
13. Increased Reliability / Availability
14. Process development / improvement
15. Number of IPR's (patents, copyrights, etc.) filed

16. Number of papers / publications presented / published in National / International seminars / symposium / Journals
17. Quality improvement
18. Knowledge Generation / Dissemination
19. Addition of New facilities / equipment
20. Any other indicator acceptable to Task Force

ANNEXURE-III

R&D Performance Target Setting cum Evaluation Template

1. To be Filled and Submitted by each CPSE to the Task Force prior to Annual Target Setting as well as Performance Evaluation of MoU.
2. Circuit Breaker: Any CPSE which has not got its Specific R&D Plan and R&D Budget passed by its Board will automatically be rated as "Poor" in R& D of MoU.
3. CPSE, while submitting self- evaluation report to DPE, will not fill up score allotted for each Table and the Total Score, as the same will be awarded by the Task Force at the time of performance evaluation of the MoU.

Table 1- Mandatory Parameter- Total R& D Expenditure as a percentage of PAT

		Unit	Weightage	Performance Target					Achievemen
				Excellent	V. Good	Good	Fair	Poor	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	**Total R&D Expenditure as % of PAT (Please refer para 3.8(i) of the Guideline)**		**2.5**						

Total Score for this Table	2.5

Score allotted by the Task Force	

Table 2 - Projects chosen by CPSE

At the time of draft MoU : *Every year, CPSEs shall submit R&D projects (Maharatna & Navratna -Five Projects, Miniratna- I&II and other CPSEs below– Three Projects along with one most important / vital/key Performance Indicator to Task Force at the time of draft MoU. The Task Force will approve the same or add any other R&D projects alongwith performance indicator(s).*

At the time of MoU Evaluation : *The verification of achievement in respect of approved performance indicator (s) and evaluation / rating of each R&D project will be done by Independent Expert/Research Advisory Committee of CPSE. Such evaluation / rating will be considered / accepted by Task Force during evaluation for allotting MoU score on R&D.*

				Target Value					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
S. No.	Projects Chosen (Annexure -I)	Performance Indicator (Annexure-II)	Weightage	Excellent	V. Good	Good	Fair	Poor	Actual
2 .1	Project-1	Performance indicator							
2.2	Project-2	Performance indicator							
2.3	Project-3	Performance indicator							
2 .4	Project-4	Performance indicator							
2.5	Project-5	Performance indicator							

Total Score for this Table	2.5

Score allotted by the Task Force	

Total Score on R&D	5

Total allotted Score for both Tables	

Explanatory Notes

1. Circuit Breaker: Any CPSE which has not got its Specific R&D Plan and R&D Budget passed by its Board will automatically be rated as "Poor" in R&D of MoU.

2. CPSE is not required to fill up the Score allotted for each Table as the Task Force, on consideration of actual achievement verified by Independent Expert or Research Advisory Committee of CPSE, will allot the marks on R&D of the MoU.

Table 1 – a) Columns 1 to 9 are to be filled at the time of submission of draft MoU. Column 10 is to be filled only at the time of submission of performance evaluation of MoU.

b) Score conversion factor as defined in the MoU Guideline will be utilised for evaluation of the performance indicators. The final score will be arrived at by multiplying the weightage of indicator (expenditure on R&D as percentage of PAT) with the respective score conversion factor based on the actual performance.

c) Expenditure on R&D projects as a percentage of PAT, mentioned at Para 3.8 will be mandatory for all the CPSEs with 2.5 weight out of total 5 for R&D in the MoU.

Table 2 - a) Columns 1 to 9 are to be filled at the time of submission of draft MoU. Column 10 is to be filled only at the time of submission of performance evaluation of MoU.

b.) Maharatna/ Navratna CPSEs shall select 5 R&D Projects and Miniratna -I& II and other CPSEs below shall select 3 R&D projects as MoU Target (Col 2 of Table 2). CPSEs shall indicate one most important/ vital/key performance indicator against each project at the time of submission of draft MoU.

c.) Score conversion factor as defined in the MoU Guideline will be utilised for evaluation of the performance indicators. The final score will be arrived at by multiplying the weightage of each

performance indicator with the respective score conversion factor based on the actual performance.

d.) Total weightage for actual achievement / milestone in respect of R&D Projects shall be 2.5.

3. MoU score conversion factors (for Table 1 and 2) on the five-point scale are 1, 2, 3, 4 and 5 for Excellent, Very Good, Good, Fair and Poor respectively. If actual performance is equal to or more than 'Excellent' target, raw score would be 1.00. If actual performance is equal to or less than 'Poor' target, raw score would be 5.00. If actual performance falls between 'Excellent' and 'Very Good', in that case raw score would be 1+(Excellent- Actual)/ (Excellent-Very Good). If actual performance falls between 'Good' and 'Fair', in that case raw score would be 3+(Good-Actual)/(Good- Fair). The raw score for the rest can be similarly calculated if the actual falls between other columns.