

**HUNDRED AND SEVENTY-FIRST
REPORT**

**PUBLIC ACCOUNTS COMMITTEE
(1983-84)**

(SEVENTH LOK SABHA)

**COUNCIL OF SCIENTIFIC AND INDUSTRIAL
RESEARCH—ENGINEERING SCIENCE GROUP**

DEPARTMENT OF SCIENCE AND TECHNOLOGY

Presented in Lok Sabha on
Laid in Rajya Sabha on

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(1983-84)

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INTRODUCTION

I, the Chairman of the Public Accounts Committee, as authorised by the Committee, do present on their behalf this Hundred and Seventy-First Report of the Public Accounts Committee (Seventh Lok Sabha) on Paragraph 40 of the Advance Report of the Comptroller and Auditor General of India for the year 1980-81, Union Government (Civil) on Council of Scientific and Industrial Research—Engineering Science Group.

2. The Advance Report of the Comptroller and Auditor General of India for the year 1980-81, Union Government (Civil) was laid on the Table of the House on 21 April, 1982. The Public Accounts Committee examined the Audit Paragraph at their sitting held on 9-2-1983. The Committee considered and finalised the Report at their sitting held on 22 August, 1983. The Minutes of the sitting of the Committee form Part II* of the Report.

3. The CSIR was set up in 1942 as a premier organisation for applied industrial research in the country. It is, however, disappointing that CSIR had failed to make any significant impact on the development of technology for use in industry. Till the end of 1979-80, only 50 per cent of the processes developed by CSIR were actually released for commercial exploitation and production had actually started in respect of less than 15 per cent of the processes. Thus, either the processes developed by CSIR were not selected properly after taking into account the requirements of the industry or the CSIR has not been able to inspire the requisite confidence in the users regarding the utility of its processes. The existing situation is most unsatisfactory and there is a need for CSIR to have a better rapport with the industry. What is really surprising is that even the public sector undertakings are not fully utilising the various facilities developed in CSIR laboratories. There is need for the CSIR to ensure maximum utilisation of the technologies developed in its laboratories/Institutes by re-orienting its research programme to bring it in the line with the country's development programme/industry's needs.

3. It is also essential that in a research organisation like the CSIR having a nation-wide network, young and bright scientists are given all encouragement so as to contribute their best to the scientific research and advancement in the country. There are

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wide-spread complaints that young scientists are being ignored in the research work in the Laboratories/Institutes under the CSIR. The CSIR should ensure proper representation to the younger scientists in the executive committees of the Laboratories/Institutes under it so as to inculcate a feeling of participation among the scientists. The working conditions of the scientists under the CSIR should be suitably improved and adequate avenues of promotion provided to them so as to attract the best talent in the laboratories.

4. Although the Public Accounts Committee has emphasised the need for introducing a system of costing for the processes developed by the CSIR as early as 1966-67, the system of costing has so far been introduced only 12 per cent of the CSIR's laboratories. In order to have an idea of the expenditure incurred on processes meant for commercial exploitation, determining the charges and royalty to be recovered in respect of the processes which are ultimately farmed out to the industry and also to guard against the possibility of arbitrary transfer of funds from one project to another by the authorities of a laboratory, it is absolutely necessary to introduce a system of project budgeting and costing in all the laboratories at the earliest. The Report has emphasised the need for the formulation of a time bound programme in this regard without any further loss of time.

5. For reference facility and convenience, the observations and recommendations of the Committee have been printed in thick type in the body of the Report, and have also been reproduced in a consolidated form in Appendix II to the Report.

6. The Committee place on record their appreciation of the commendable work done by the Public Accounts Committee (1982-83) in taking evidence and obtaining information for this Report.

7. The Committee also place on record their appreciation of the assistance rendered to them in the matter by the office of the Comptroller and Auditor General of India.

8. The Committee would also like to express their thanks to the Officers of the Council of Scientific and Industrial Research for the cooperation extended by them in giving information to the Committee.

NEW DELHI:
September 5, 1983
Bhadra 14, 1905 (S)

SUNIL MAITRA,
Chairman,
Public Accounts Committee.

REPORT

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH— ENGINEERING SCIENCE GROUP

1. The Audit para No. 40 on Council of Scientific and Industrial Research—Engineering Science Group as appearing in the Advance Report (Civil) of the C&AG for the year 1980-81 and on which this Report is based, is reproduced as Appendix I to this Report.

2. The Council of Scientific and Industrial Research (CSIR) was constituted in 1942 as a society registered under the Registration of Societies Act, 1860 for fostering industrial development in the country. Its main objectives are:

- to undertake scientific and industrial/applied research of national importance directed towards continuous improvement of indigenous technology and adaptation and development of imported technology;
- to utilise the results of research towards the development of industries;
- to establish and award research fellowship and finance specific researches; and
- to establish, maintain and manage laboratories, workshops, institutes, etc. for the achievement of its objectives.

Administrative set up

3. Its affairs are administered, directed and controlled by a governing body consisting of a Director General (who is *ex-officio* Chairman of the governing body), five Directors of the laboratories who are chairmen of the Co-ordination Councils pertaining to each of the five groups of sciences, Member (Finance) and three experts nominated from outside the CSIR.

The research establishments of the CSIR are divided broadly into 5 major disciplines, viz. (i) physical and earth sciences; (ii) chemical sciences; (iii) biological sciences; (iv) engineering sciences; and (v) information sciences.

4. One of the main objectives of the establishment of CSIR was to undertake scientific and industrial/applied research of national

importance directed towards continued improvement of indigenous technology and adaptation and development of imported technology. The Committee enquired how far the CSIR has been successful in achieving this objective. In reply, the C.S.I.R. have state in a note:—

“Research and development directed towards continuous improvement of indigenous technology and adaptation and development of imported technology is one of the objectives for which the CSIR is established.

- (a) To the limited extent, that services of CSIR have been utilised for this specific purpose, it has succeeded but the above objective is co-related to the extent of interaction with and co-operation of industries which possess and use the indigenous technology or imported technology. It has been the experience that the industries are many a time reluctant to disclose the technical details regarding the process knowhow, plant design etc. of the technology being used. This is more true in case of imported technology where industries bank more on support from their foreign collaborators and CSIR laboratories are rarely associated with the implementation, working, adaptation and improvement of technology. In the case of indigenous technology or indianised technology, the industries are coming forward to seek the expert assistance from CSIR laboratories for collection of process data, improvements/modifications or problem solution. Such assistance is provided on sponsored or consultancy basis. The data given below will indicate the quantum of sponsored and consultancy work undertaken by CSIR laboratories for industries (private|public), government agencies etc.

| Year | Sponsored projects | | Consultancy | |
|---------|--------------------|-------------------------|-------------|-------------------------|
| | Number | Value (Rs. in lakhs) | Number | Value (Rs. in lakhs) |
| 1979-80 | 653 | 965.96 | 270 | 69.73 |
| 1980-81 | 663 | 986.02 | 347 | 97.09 |
| 1981-82 | 601 | 840.11 | 440 | 85.54 |

(Annual projects carried over from previous Year)

- (b) Some examples of improvements/modifications in indigenous technologies are given below:
- (i) Simulation studies of ammonia plant for Gujarat State Fertilizer Company by RRL Hyderabad (productivity improved to the extent of Rs. 170 lakhs per year).
 - (ii) Techno-economic viability of process for chloroquin phosphate for Bengal Immunity Co. by RRL Jorhat (process improvement).
 - (iii) Boarax at Pugga Valley for J & K Minerals by RRL/Jammu (use of geo-thermal energy).
 - (iv) Lead from zinc residues for Hindustan Zinc Limited by RRL Bhubaneswar (waste utilisation).
 - (v) Glazed wall tiles by CGCRI (lower cost and lower firing temperature).
 - (vi) Cordierite based saggars by CGCRI for pottery industry (can stand 40 firings instead of 4—6).
 - (vii) Single phase to three phase convertor by CEERI for RDSO (for replacing the rotary convertor).
 - (viii) Process control instruments for sugar industry by CEERI and CSIO (for modernisation and better sugar production). ..
 - (ix) Caustic soda production using Titanium Substrate Insoluble Anodes by CECRI for chlor-alkali industry (energy saving and longer life of anodes).
 - (x) Aluminium alloys for electrical transmission by NML (to replace copper).
 - (xi) Vertical shaft kiln for cement production by RRL Jorhat (scale down and modification of process).
 - (xii) Vapour phase oxidation of toluene to benzal-dehyde by NCL for M/s. Indian Organic Chemicals Ltd. (change in catalyst and design).
 - (xiii) Cola Flavour Blend by CFTRI for Modern Bakeries (substitute for imported Cola flavour).
 - (xiv) Improved design of machinery;
 - (a) 15/20 H.P. Tractors by CMERI.
 - (b) Paddy harvester and matching implements by CMERI.

- (c) Improved wick store by IIP.
- (d) Brick making machine by CBRI.
- (e) Improved gas stove by MERADO Ludhiana.

- (xv) Improved methods of Tanning and leather manufacture by CLRI for tanneries.
- (xvi) Improved plant material and techniques of cultivation for medicinal and aromatic plants (CIMAP), RRL (Jammu).

II. *Adaptation of imported technology*

CSIR is associated with the adaptation of technology for Phthalic anhydride. RRL Hyderabad is working jointly with EIL on the process and the catalyst."

5. When asked about the assessment of the working of CSIR laboratories, the representative of the CSIR stated:—

"The calibre of the scientists in the Institute is of a high order. This may not be so in the future because we are finding it extremely difficult to recruit scientists of high calibre and we are not able to get suitable persons for some of the senior posts....The inflation in the price of chemical apparatus, equipment, books and journals has been such that even 10 per cent increase in allocation does not catch up with the inflation. We have more people, but not enough tools and equipment to provide them to get their best."

6. The witness further stated:

"I think our scientists are well motivated, well enthused and within the means they are doing good work. But in certain forward areas, we are facing difficulties. These are the areas which have emerged during the last ten years and there we do not have adequate educational facilities as also adequate research facilities..... We had detailed discussion for the next year's budget and we came to a figure of Rs. 56 crores with the Planning Commission. We were informed a week back that due to great financial constraints, that has been reduced to Rs. 47 crores."

Engineering Science Group

7. The Engineering Sciences Groups reviewed by audit (1980-81) are:

- (i) Central Glass and Ceramic Research Institute (CGCRI), Calcutta.
- (ii) National Metallurgical Laboratory (NML), Jamshedpur.
- (iii) Central Mining Research Station (CMRS), Dhanbad.
- (iv) Central Mechanical Engineering Research Institute (CMERI), Durgapur.
- (v) National Environmental Engineering Research Institute (NEERI), Nagpur.)
- (vi) National Aeronautical Laboratory (NAL), Bangalore.
- (vii) Regional Research Laboratory (RRL), Bhubaneshwar.
- (viii) Structural Engineering Research Centre (SERC) Roorkee and Madras.

There is executive Committee for each laboratory/Institute. These executive Committees are constituted under the rules and regulations of CSIR. CSIR is responsible for the control and general direction of the laboratories/institutes.

Planning and Execution of Research and Development Projects

8. The projects to be undertaken by the CSIR laboratories/institutes are formulated and approved by their respective executive committees which are assisted in their deliberations by scientific advisory committees. Under the bye-laws laid down by CSIR, the executive committees are expected to meet once in a month but in any case not less than 4 times in a calendar year to carry out their functions, relating to formulation and approval of research and development plans, allocation of resources among the projects undertaken and to evaluate the performance of these projects.

9. The executive committees, however, met far less than the required number of times. The meetings of the scientific advisory committee were similarly very few. In February, 1980, a Research Advisory Council consisting among others of scientists from outside the institute/laboratory concerned was constituted by CSIR in replacement of scientific advisory committees with a view to making the system more broad based and objective. The Council

thus formed was to meet at least twice in a year, in respect of each laboratory/institute. According to the figures furnished by Audit the meetings held by respective Committees/Council were as under:

| | Executive Committee meetings held during January 1974 to December 1980 (7 years) | Scientific Advisory Committee meetings held during January 1974 to December 1979 (6 years) | Research advisory Council meetings held during February to December 1980 (11 months) |
|-------------------------------|--|---|---|
| 1. CGCRI, Calcutta | 17 | 2 | — |
| 2. NML, Jamshedpur | 15 | 3 | 2 |
| 3. CMRS, Dhanbad | 22 | 6 | 1 |
| 4. CMERI, Durgapur | 21 | 3 | 1 |
| 5. NEERI, Nagpur | 22 | 6 | 1 |
| 6. NAL, Bangalore | 21 | 7 | 1 |
| 7. RRL, Bhubaneswar | 24 | 5 | 2 |
| 8. SERC, Roorkee and Madras. | 14 | 12 | 1 |

10. The Committee enquired about the reasons for not holding the meetings of the Committees to the prescribed extent.

In a written reply the CSIR have stated as follows:

“The main constraints in holding the meetings of the Committee to the prescribed extent are the difficulty in fixing up a date convenient to all the outside members (who are all eminent and hence very busy) and delay in the finalisation of the minutes of the earlier meeting after getting the remarks and comments of various members. Every endeavour is being made to hold these meetings to the prescribed extent. In this connection, the laboratories have been told that they should fix a time-schedule for such meetings at the beginning of the year and ensure that these are adhered to. It is also proposed to monitor this from Headquarters. A copy of the circular issued in this connection appears (Appendix-II).

11. The Committee enquired as to how the Council was able to review the working of the laboratories/institutes when the executive committees did not meet more than once a year. In reply, Director General, CSIR stated before the Committee:

“Regarding the meeting of the executive committee, we are

aware that earlier these were not held periodically. But this year, already 4 meetings have been held for three laboratories; three meetings have been held for 17 laboratories and still there is a month and a half to go; and two meetings have been held for 16 laboratories. We are hoping that they will have one more meeting. And for next year, it will have four meetings or more."

The witness further stated:

"The major difficulty was that the Director wanted that outside members should be able to come. Most of the time they are not able to come....The meetings are not being held regularly and we are going into these things."

12. To a question whether the Executive Committees of the Institutes/Laboratories were able to evaluate the performance of all the projects each year in the meetings which were far less than envisaged, the Council of Scientific and Industrial Research have stated in a written reply:

"Yes, please. Notwithstanding the fact that the meetings of the Executive Committee were not held to the extent prescribed in the bye-laws, all projects undertaken by laboratories in a year, were evaluated and approved by them before they were taken up, in the light of the overall directions and recommendations of the Research Advisory Committees and Co-ordination Councils. The performance of each project was further evaluated from time to time in the meetings at Headquarters and during the Annual Plan discussions."

13. The Committee enquired how it was possible to review 2165 projects between 1974-75 and 1979-80 in only 156 executive committee meetings i.e. 13.8 projects per meeting on an average and was it not necessary that projects are reviewed after full care and detailed examination. In reply, D.G. CSIR stated before the Committee:

"I have given an assurance that this is a thing of the past and hereafter we hope more time will be devoted."

1.4 The projects to be formulated by the CSIR laboratories Institutes are approved by their Executive Committees which are assisted in their deliberations by Scientific Advisory Committees. The Executive Committee of each laboratory also approves the development plans, allocates resources among various projects and evaluates performance of these projects. Under the bye-laws laid down by CSIR the Executive Committees are expected to meet once in a

month but in any case not less than four times in a calendar year. However, the actual number of meetings of Executive Committees and Scientific Advisory Committees of the Laboratories/Institutes has been much less, e.g., there were only 14 meetings of the Executive Committees of the Structural Engineering Research Centres, Roorkee and Madras in 7 years (January 1974 to December 1980). The position in respect of other laboratories/Institutes is not much better. The result has been that a very large number of projects had to be evaluated and approved at each meeting. Thus, as many as 2165 projects were reviewed at 156 meetings of the Executive Committee i.e., about 14 projects at each meeting. When as many as 14 projects are to be evaluated on a single meeting, the evaluation can only be superficial and perfunctory. Dropping of a project or ultimately a project proving itself infructuous is in the nature of things in any research organisation. This by itself cannot be interpreted as an act of omission. The Committee would not have any occasion to make any comment had the situation been in the CSIR like this. But there is no way of knowing for sure that dropping of a large number of projects in the CSIR fits in this category. On the contrary, scrutiny and sanction of as many as 14 scientific projects on an average in a single meeting do strengthen the belief that the examination of the projects were casual and desultory. If in the end a large number of projects had to be dropped, it is difficult for the Committee to accept the argument that it is in the nature of things in such research organisations. The Committee would like to express their unhappiness at this situation. They would emphasise that the meetings of the Executive Committees and Research Advisory Committee (which has since replaced the Scientific Advisory Committees) should be held more frequently so that the projects to be taken by CSIR laboratories/Institutes are formulated with thoroughness and the progress of ongoing projects evaluated in detail. In any case, the number of meetings should not be less than that laid down in the bye-laws of the CSIR.

Project Budgeting and Costing

15. It has been pointed out in the Audit para that although a system of project budgeting had been formally introduced in the 8 laboratories of the Engineering Sciences Group, except in the case of National Aeronautical Laboratory, Bangalore, the project budget did not give information about the progressive actuals relating to various components of each project upto the end of the year and during previous year compared with the estimated expenditure on each component during the currency of the project, etc. Further, no reports comparing actuals with estimates in the project budgets

were made available to the Executive Committee. As a result, the project budget estimates continued to give nothing more than an arbitrary break-up among the projects of estimates under the conventional heads *viz.* salaries, contingencies, etc. Consequently the purpose of introducing project budget with a view to relate expenditure instead of the assumed needs of tools and manpower for the entire Institute/Laboratory was defeated.

16. In para 1.104 of their 59th Report (Third Lok Sabha), the Public Accounts Committee (1966-67) had recommended/observed as follows:

“The Committee regret to note that the CSIR which has been in existence for over two decades did not think of introducing a system of costing for the processes developed by them. The Committee feel that this should have been done much earlier. The Committee note that the work relating to the costing of scientific and industrial processes developed for commercial exploitation has been introduced from last year in 7 or 8 of the laboratories only by the Council. They desire that as a result of this experiment the system of costing should be further extended to all other laboratories. With the introduction of a system of costing of processes, the Committee hope that the Council would be able to have an idea of the total expenditure incurred by it on the development of various processes.”

17. The Public Accounts Committee (1968-68) in para 1.7 of their 75th Report (Fourth Lok Sabha) again reiterated the need for introducing the system of proper accounting as follows:

“In order to have an idea of the expenditure incurred on processes meant for commercial exploitation, the Committee feel that it is necessary to introduce the system of cost analysis for processes in all the laboratories. This would provide a rational basis for determining the charges and royalty to be recovered in respect of the processes which are ultimately farmed out to industry. The Committee would, therefore, like to emphasise that a general pattern of cost analysis should be expeditiously evolved for introduction in all laboratories on the basis of the results of the system of costing already in operation in some of the laboratories on an experimental basis. There is a cost accounts Branch in the Ministry of Fin-

acted in this regard. The Committee are of the firm view that in order to have an idea of the expenditure incurred on processes meant for commercial exploitation, determining the charges and royalty to be recovered in respect of the processes which are ultimately farmed out to the industry and also to guard against the possibility of arbitrary transfer of funds from one project to another by the authorities of a laboratory, it is absolutely necessary to introduce a system of project budgeting and costing in all the laboratories at the earliest. The Committee desire that a time-bound programme should be formulated in this regard without any further loss of time. The Committee would like to be apprised of the progress made in this regard.

Monitoring and evaluation of projects

23. The Study Team appointed by the CSIR in 1975 recommended in its report, submitted in 1976, *inter alia*, the establishment of a project planning, monitoring and evaluation cell in the laboratories/institutes consisting of a scientist, an economist, an accountant and a management expert with a view to concurrent monitoring and evaluation of projects taken up for research, as well as for planning future work. Although project planning, monitoring and evaluation cells had been created in four laboratories/institutes in none of these laboratories/institutes were the cells manned with the minimum strength of experts for the purpose in view and their functions were mostly clerical.

24. To a question as to how in the absence of adequate staff in the Planning, Monitoring and Evaluation Cells, the projects were concurrently monitored and evaluated, the CSIR have replied in a written reply* as under:

“There are standing internal committees in each laboratory for the planning, monitoring and evaluation of the projects. This is also done by the Director in consultation with the concerned project leaders. However, it is the endeavour of the CSIR to staff the cells adequately and strengthen this process to achieve greater efficiency.”

25. When asked why the planning monitoring and evaluation cells were not adequately staffed, the CSIR have stated in a note as follows:

* “While it is true that the planning monitoring and evaluation cells are not adequately staffed at present in most

*Note was vetted by Audit with observations.

of the laboratories, efforts are being made to strengthen them gradually subject to resources constraints and availability of suitable personnel."

26. A Study Group appointed by the CSIR had in 1976 emphasised the need for establishment of a project planning, monitoring and evaluation cell in each laboratory/institute under the CSR for the purpose of monitoring and evaluation of projects taken up for research concurrently as well as for planning future work. The Committee are dismayed that such cells have so far been set up in four laboratories only, and even in these laboratories the cells have not been equipped with the minimum number of experts required for the purpose and these cells have been performing only clerical functions. Since continuous monitoring, evaluation and future planning are essential for the efficient functioning of any Research programme, the Committee desire that early steps should be taken for setting up project planning monitoring and evaluation cell in such laboratories/institutes under the CSIR where these have not been set up so far, and it should also be ensured that these cells are equipped with the requisite number of experts. The Committee are of the view that budgetary constraints should not be allowed to stand in the way of setting up of such cells and equipping them properly as these are necessary to ensure that moneys spent on all research projects are justified and well spent.

Abandonment of Projects

27. The audit para has pointed out that out of 141 abandoned projects test checked in audit, 16 were in operation for over 5 years, 26 from 3 to 5 years, 76 from 1 to 3 years and the rest 23 projects were abandoned within one year. According to CMERI, Durgapur the causes for the abandonment of the projects were lack of adequate initial planning and survey before undertaking the projects. The reasons assigned by other laboratories/institutes of CSIR for abandonment of these projects were lack or non-availability of machinery, equipment and other facilities, availability of products/goods in the market through efforts of others.

28. When enquired why these factors were not considered before taking up the projects, the CSIR have stated in a note*:

"Projects are invariably taken up only after taking into account all known factors. The factors like the lack or non-availability of machinery, equipment and other facilities, non-viability of the projects etc. could not have been foreseen before the projects were taken up, as these

*Vetted with observations by Audit.

come to light subsequently during implementation. It may be appreciated that R&D activities do involve experimentation and take of a certain amount of risk and it is not unusual to abandon projects in the light of experience.

The other reasons given by CSIR (December, 1980 and October, 1981) of the abandonment of the projects were: (i) results were not encouraging; (ii) projects were not viable; (iii) similar works were in progress elsewhere (iv) some of the processes were not acceptable due to economic viability; and (v) lack of subsequent enthusiasm by the sponsoring parties."

29. The Committee enquired about the criterion on which a process on project is taken up and the criterion for giving up project. In reply, Director General, CSIR, stated before the Committee:

"First of all on the selection of project, the origin of a project can be from more than one source: sometimes an idea may occur to the scientist within the laboratory or a group of scientists may suggest a project; sometimes an idea may arise from a potential entrepreneur who would say that work on this may be done; sometimes in major projects we will identify that this is something of national importance and work on this should be done. A preliminary discussion will generally be held in the laboratory to see its scientific potential. If this is satisfactory and it shows progress, then a note would be compiled that such and such information is available in such and such literature, books or journals. It would then be decided whether one has the capability capacity, equipment, etc. Then a project proposal will be formulated. The project proposal will come to the Research Advisory Council. Before that, exploratory work is done at all laboratories; there may be alternatives (a), (b), (c); small scale experiments may be done before it is sent to the Research Advisory Council. That is the process of project selection."

30. The witness further stated:

"Now we come to dropping of the project. Dropping is a very normal process in any research establishment because research itself does not guarantee that every process,

will be successful, and the number of projects which we are dropping is very little compared to the number of projects that we do. We are taking steps on that; we are discussing with Directors and are also having correspondence that many more projects should be dropped. A good research management consists in dropping a project as quickly as possible, and within the first year, many projects should be dropped. In some industrial undertakings, I have seen, a project is not sanctioned for more than one year. And in the one year it is reviewed and it is found that it has no good prospect and that is dropped and the money is written off."

31. Audit para has also pointed out that the Central Mining Research Station, Dhanbad did not keep any record of the research and development projects approved during 1974-75 to 1978-79. The annual reports of the Central Mining Research Station recorded the progress of only those projects on which significant progress had been made during the year. It has been further pointed out that CMRS was not able to furnish information about 49 projects including the expenditure incurred thereon.

32. When enquired why no record was maintained in CMRS, Dhanbad for the projects approved during 1974-75 to 1978-79 the CSIR replied in a note as follows:

"No detailed records were maintained by CMRS, Dhanbad because they were mostly of a routine nature. Being located in the mining belt and being the only institution of its nature, CMRS, Dhanbad has to undertake a large number of small projects at very short notice. CMRS, Dhanbad has, however, been advised to maintain records in respect of all major projects."

33. When asked why it was not possible for CMRS, Dhanbad to furnish information in respect of 49 projects, the Committee have been informed that "it was mainly due to non-maintenance of separate accounts."

34. The Committee note that out of 141 abandoned projects test checked in audit, as many as 16 were in operation for over 5 years, 26 from 3 to 5 years, 76 from 1 to 3 years and the remaining 23 projects were abandoned within one year. While the Committee grant that abandonment of some projects in the field of research may be

unavoidable, it is surprising that some of the unproductive or unfeasible projects were allowed to continue for as long as 5 years or even more before a decision was taken to abandon the projects. Some of the reasons given for abandonment of projects like lack or non-availability of machinery, equipment and other facilities or similar works being in progress elsewhere clearly shows that these projects were undertaken without adequate survey and planning and after undertaking these projects adequate monitoring and review was not done to see whether the projects should be allowed to continue. In his evidence before the Committee, the Director General, CSIR stated that a good research management consists in taking a decision in this regard within the first year. He also stated that in many industrial undertakings, projects were not sanctioned for more than one year. The Committee, recommend that research projects in the laboratories/institutes under the CSIR should be undertaken after adequate survey and careful examination taking into consideration all relevant factors like economic viability, availability of machinery and equipment, etc. so that the need to abandon the project subsequently may be reduced to the minimum, and after a project has been undertaken its progress should be continuously watched and a decision to drop a project should be taken in the initial stages itself so that infructuous expenditure on abandoned projects is the barest minimum.

35. The Committee are surprised to note that in the Central Mining Research Station, Dhanbad, no records of the research and development projects approved during 1974-75 to 1978-79 were maintained. In respect of as many as 49 projects, requisite information including the expenditure incurred on the projects was not available. The reply furnished by the CSIR that no records were maintained because these projects were of a routine nature is unconvincing. The Committee have already recommended the imperative need for project budgeting and costing in all the Laboratories/Institutes under the CSIR. The Committee desire that full records of all the projects undertaken by the laboratories/Institutes, under the CSIR, should be maintained so as to give an idea about the cost benefit ratio of the projects.

Duplication of Projects

36. It is has stated in the Audit para that the project "household pump", was taken up by CMERI Durgapur, in August, 1974 and was completed in June, 1975. A similar project was started by NEERI, Nagpur, in August, 1976 and the work was carried out upto

April, 1978. It was abandoned on grounds of duplication of efforts. This apparently was a case of lack of coordination between the two institutes.

37. The Committee enquired why coordination between the CSIR laboratories was not being maintained to avoid duplication in taking up the projects. In reply, the CSIR have stated in a note* as follows:

"The instance pointed out by Audit is a very stray case. There is a built-in machinery in the CSIR set up through the mechanism of Coordination Councils to ensure that such duplication of efforts does not take place without valid reasons."

38. When asked about the level at which Coordination was being maintained between the laboratories under CSIR, the Director General, CSIR stated:

"In Nagpur, the outlay for the project was less than Rs. 10,000. Therefore, the magnitude of expenditure that has gone into duplication is limited to this. The second thing is that in the Coordination Council meeting, they discuss the nature of the priority to be assigned and they do not go into each small thing. Otherwise, it would require much more time. In an organisation which handles about 2540 projects, there was this minor duplication. We accept that."

39. The Committee find that the project 'household pump' was taken up by Central Mechanical Engineering Research Institute, Durgapur in August 1974 and completed in June 1975. Another project on 'household pump' was taken up in August 1976 in another laboratory under the CSIR and was abandoned in April 1978 only when it came to notice that the project on 'household pump' was already in existence since 1974. This clearly indicates absence of proper coordination in research efforts in various laboratories/institutes under the CSIR leading to duplication of efforts and infructuous expenditure. The CSIR has tried to explain this lapse stating that this was a minor project involving an expenditure of less than Rs. 10,000. The Committee are not satisfied with this reply. It is not the outlay in financial terms which is important but the lacuna in the system which allowed this duplication to take place and the circumstances in which the duplication could not be

*Note Vetted by Audit with observations.

detected for about 4 years, 1974—1978. The Committee desire that the matter may be gone into with a view to evolve a foolproof system to obviate the possibility of such duplication of efforts in future.

Utilisation of the results of Research

40. The processes developed by the laboratories/institutes are mostly released to the industries for commercial exploitation through National Research Development Corporation (NRDC) on payment of lumpsum premia and recurring royalty for periods ranging from 5 to 14 years at the pre-determined rates. The proceeds are shared by the CSIR and NRDC in the ratio of 70:30. The premia and royalty earned by the CSIR during 7 calendar years (1974 to 1980) in respect of Engineering Sciences Group of laboratories/Institutes amounted to Rs. 70.67 lakhs (premia Rs. 3.27 lakhs and royalty Rs. 67.40 lakhs).

41. According to the Audit para. till the end of 1979-80 8 Laboratories/Institutes had referred 295 processes to the NRDC, of which 26 processes had been dropped or withdrawn subsequently, 13 were released free to the industries either due to the lack of demand from the industries or for the growth and development of small scale industries and 147 were released on payment of premia and royalty. The remaining 109 processes had not been released by the NRDC, for commercial exploitation till June, 1981.

42. It has been further stated in the audit para that according to the agreement executed by the NRDC with the industries, production was to be started using these processes within one year. Out of 147 processes, only 39 were utilised for production and in respect of the remaining 108 processes, production had not started till June 1981 although the prescribed period of one year had expired in all these cases.

When asked why 26 processes were dropped or withdrawn from NRDC, the CSIR have stated in a note as follows:

“These processes were dropped/withdrawn about 12 years back. The processes are usually dropped by NRDC for the following reasons:

- (i) Process becomes obsolete or has become uneconomical due to market developments.

- (ii) A patent was taken. However the scale of work was not adequate for commercialisation.
- (iii) In case of machinery only design drawing were made. Prototypes were not fabricated for trials and demonstration.
- (iv) Difficulty in procuring imported machinery, components and materials.
- (v) The concerned scientists has left the laboratory and consequently further development work and transfer of technology was not possible.

The know-how for "Windmill" of NAL consisted of sale of design drawings only. It was, therefore, withdrawn from NRDC. The set of design was subsequently, sold directly to three parties for Rs. 500/- each."

43. The Committee sought to know the system of coordination and feed-back between CSIR and NRDC and the steps taken to improve the same. In reply, the CSIR have stated in a note:

'At present, the processes before reference to NRDC for commercial exploitation are examined by the Process Release Committee and Executive Committee of the Laboratories for scale of development work, need for pilot plant or prototype investigations terms of release, etc. NRDC is represented on Process Release Committees of some laboratories. The review of the processes has been undertaken jointly by CSIR, NRDC and the laboratory concerned in case of some laboratories. There is no standing mechanism for co-ordination between CSIR and NRDC in this regard as during the last nearly 10 years, no process referred by CSIR has been dropped or withdrawn by NRDC.'

44. The Committee enquired the reasons why out of 147 processes only 39 were utilised for production and in respect of the remaining 108 processes production had not been started within the prescribed period of one year. In reply, the CSIR gave the following reasons:

- (i) Incompetence of the entrepreneurs
- (ii) market demand pattern
- (iii) financial constraints for further development work
- (iv) difficulties in generating investment capital, etc.

45. The Committee in this connection asked why such factors were not considered before taking up these projects. In reply, the CSIR have stated in a note:

"The factors were not considered before taking up the relevant projects, as these could not have been foreseen at that time. Further, they are extraneous factors over which CSIR has no control. It may further be mentioned that CSIR is not an industrial consultancy organisation."

46. Regarding the non-release of 109 developed processes on which CSIR was to receive premium and royalty the Committee desired to know how it (CSIR) was not responsible. The CSIR in this regard have stated as under:

"Under the agreement between CSIR and NRDC of 1956, it is the responsibility of the latter for commercial exploitation of the processes, though CSIR and its laboratories actually pursue pending cases with them (NRDC). Since NRDC did not succeed in releasing these processes, the question of receipt of royalty/premium does not arise."

47. The NRDC was required to keep CSIR informed about the utilisation of processes. The CSIR was also expected to enquire about the progress in the matter.

When asked why the procedure was not being followed the CSIR have stated in a note* as follows:

"NRDC has, from time to time, been requested by CSIR to furnish the required returns. CSIR is not receiving monthly data from NRDC regarding processes released to industry indicating the process, name of the party and terms of release. As regards bi-annual inspection reports, this has also been since taken up with NRDC by CSIR. Close and continuing interconnection between NRDC and CSIR is being made to improve the situation."

48. Asked about the reasons why large number of processes developed by laboratories are not picked up by the industry for commercial exploitation the CSIR have stated:

"(i) The need of the industry or availability of the project ascertained in many cases, but reliable economic data is not always available.

*Note Vetted by Audit with observations.

(ii) It is not admitted that a large number of processes developed by the laboratories are not picked up by the industry for commercial exploitation.

(iii) It is further pointed out that commercial exploitation of a process is dependent upon many factors other than the technical know-how developed. Some of these factors are:

the competence of the engineering company;
the competence of the client;

continuous availability of power;
availability of raw materials at a given time;

stock piling of products as soon as industry comes to know that indigenous know-how is in the pipeline;
how is in the pipeline;

dumping of imported products when the Indian entrepreneur goes into production;

lack of reasonable protection of products manufactured by indigenous know-how by suitable fiscal measures; an Indian product, for example, may have a higher cost of production because of higher price of raw-materials or power in India;

unsympathetic attitude towards development and utilisation of indigenous know-how and subjecting it to unfair competition.

(iv) Insistence of industry to use only proven know-how many a time kills good Indian know-how. Risk investment for putting up major plants with Indian know-how is generally not available.

The factors enumerated above vitiate cost-benefit ratio calculations."

49. The reasons given by CSIR for non-realisation of royalty from 35 parties were:

"The laboratory had written letters to the parties with no response. They propose to visit the industries to settle the matter. Progress in this regard will be watched."

50. It has been pointed out in audit para that 39 processes were being utilised for commercial exploitation. Out of these processes

regular instalments of royalty were not being received in respect of 29 processes. When asked about the reasons for non-receipt of royalty, CSIR have stated in a note* as follows:

"It is the responsibility of NRDC to exploit the processes commercially and remit the CSIR's share of premia/royalty regularly. NRDC furnishes periodically a statement of receipts of royalty/premia, to CSIR as well as to the laboratories. The non-receipt of regular instalments of royalty is taken up with the NRDC from time to time and this is a continuing process. As per information received from NRDC (Feb. 1982), total number of processes in production is 70, of which expired licences were 22. Out of the current 48 processes in production, 6 entail no recurring royalty. For the years 1980 and 1981, CSIR received premia/royalty from NRDC for 22 and 24 processes respectively. Laboratory-wise statements of processes/parties reported to be in production, but where no royalty was received, were sent to NRDC during 1980 and 1981 (with copy to laboratory), but no reply has been received from NRDC."

51. The CMRS, Dhanbad undertook during 1974-75 to 1979-80, 864 projects sponsored and financed by outside organisations. The sponsoring industries were required to furnish to CMRS, within 90 days their intention for commercial exploitation of the process know how. No such option was furnished by 67 parties and royalty became payable from 48 parties for released processes. Royalty amounting to Rs. 1.32 lakhs was however, released upto 31st March 1980 from only 13 parties.

52. Regarding the steps taken for the commercial exploitation of the processes from which option had not been received, CSIR have informed in a note* as under:

"It may be pointed out here that the sponsored projects undertaken by CMRS, Dhanbad were mainly to cater to the public sector mining industry in and around that area. Since the process developed in these cases was given on a non-exclusive basis, it is open to the laboratory to make it available to other interested parties. However, the response from the interested parties is not encouraging so far. It may be mentioned here that even though the commercial exploitation in these cases might not have taken place, the expertise generated is of great value to

*Vetted by Audit with observations.

the laboratory|CSIR. Further, some of the projects were aimed at solving local mining problems of an immediate nature and did not result in a saleable know how."

53. The Committee enquired if there were cases where processes developed by CSIR were not accepted or purchased but were utilised by the industry in a clandestine manner. Director General, CSIR replied before the Committee:

"We come across such things in the industry that they are using HCL and therefore we use sulphuric acid and regard it enough not to pay royalty; To that extent, modifications are made. We are not dealing in many cases. But such practices are not ethical."

54. The Committee pointed out that even the public sector undertakings were not seeking the assistance of CSIR laboratories in their R&D efforts and enquired about the reasons for the same. Director General, CSIR stated in evidence before the Committee:

"It is a very complex question. We have looked at our own shortcomings, we have also looked at their own attitude. Their attitude is that they buy a know-how. When they buy a know-how, they do not feel the need for doing research. We have suggested that we would be happy to associate with them for buying a know-how. We think we can render good services. If the association of research comes with purchase of know-how, the evaluation of further development is better than we can always at the same time establish mechanism for absorption of that know-how. We are going to them in all humility and telling them that we have expertise which we place at your disposal."

The witness further stated:

"I say, the (CSIR) is a good organisation. Give it work, utilise that work. I am sure you will get encouraging results on that."

55. The Committee enquired why CSIR could not develop colour T.V. technology before Asiad with the result that Government had to allow import of colour T.V. In reply, D.G., CSIR stated:

"We had developed colour T.V. without the picture tube and only a limited number of circuits had to be imported."

We had made this in the laboratory. It is true that we had entered into an agreement with the CEL that they would market it. We finalised the licensing terms with them. Then we were advised that CEL were not in this field and the ECIL were in the field of T.V. and that we should talk to them. Then we negotiated an agreement with them saying that they would make 500 sets straight-way. We gave them full documentation. They expressed their satisfaction and telexed that they will sign the agreement. At that time Government decided to import kits... The situation is that we come to a certain standard and at this time the Government does not want to use its know-how."

56. When asked why it took CSIR three years to develop this technology, the witness replied:

"This technology basically depends on the new integrated circuits. But they are not made in this country. For development of integrated circuits, please look at the tremendous investments that are made outside. It is a question of investment... We made an estimate if we have to reach this break-through, we need an investment of Rs. 200 crores in R&D in this plan and the Seventh Plan. The Planning Commission called a High Level meeting and I think that by the time the Task Force makes recommendation, this estimate will be going up in the neighbourhood of Rs. 400 crores. If Government decide that they can spend Rs. 400 crores over a period of seven years, then we can say we will be only half a generation or one generation behind. But in the meanwhile if we do not do that, then today we cannot go into the field of micro-electronics in the self-reliant way.. If we go back 20 years from now, we will notice that Japan and India was in the same status. They got the technology from America, but Japanese pledged to themselves that they would by 1980, catch up with the Americans. They are now ahead of the Americans and we are still buying technology from other countries and by the time you take that technology and put it into practice, you are already 3-4 years behind. So there is no escape from substantial R&D investment if you want to be self-reliant."

Research Projects for Weaker Sections of Society

57. When asked about the details of projects developed by CSIR for the benefit of poor sectors of the population viz, artisans, minor tools for agriculturists, etc. Director General, CSIR stated before the Committee:

"We are very conscious of the sector that you have mentioned. I have put a full time officer in the grade of Deputy Director at Headquarters to organise this thing. We have taken stock of what we have done and can be done in a bigger way at the village level according to the investment needed say Rs. 50,000 to Rs. 1,00,000. The list of these technologies have been compiled... To begin with, we will put up one centre in a village chosen by Government; and there we will put in a number of such industries, five to ten, depending on what is available... An organisation CARI is being formed in the Ministry of Rural Development. We have said that they can treat us as their Research and Development Wing and we will put the required number of people on the problems identified. We are also inter-acting with other organisations. But beyond that it is not possible and extension is our weak point..... we should have worked with other agencies and experts in that field."

58. When asked about the number of persons engaged in this work, the witness stated:

"I will not be able to give that. But it will be a very small proportion, that is what I can say."

59. CSIR was set up as a premier organisation for applied industrial research in the country. The Committee are disappointed to note that the CSIR has failed to make any significant impact in the development of technology for use in industry. This is evident from the fact that till the end of 1979-80, 8 Laboratories/Institutes of the CSIR had referred 295 processes to the National Research Development Corporation (NRDC) for commercial exploitation. Out of these, 26 processes had been dropped or withdrawn subsequently. 13 were released free to the industries and 147 released on payment of premia and royalty. The remaining 109 processes had not been released by NRDC for commercial exploitation till June 1981. Even out of 147 processes released on payment, only 39 were utilised for production and in respect of the remaining 108 processes production had not started although the

prescribed period of one year had expired. Thus less than 50 per cent of the processes developed by CSIR were actually released for commercial exploitation and production had actually started in respect of less than 15 per cent of the processes. This clearly shows that either the processes developed by CSIR were not selected properly after taking into account the requirements of the industry in the country or the CSIR has not been able to inspire the requisite confidence of users regarding the utility of its processes. The Committee feel that the existing situation is most unsatisfactory and there is a need for the CSIR to have a better rapport with the industry. The Committee urge CSIR to take necessary measures to ensure maximum utilisation of the technologies developed in its Laboratories/Institutes by reorienting its research programme, to bring it in line with the country's development programme/industry's needs. One of the reasons given by the CSIR as to why a large number of processes developed by the CSIR laboratories are not picked up by the Industry for commercial exploitation is 'dumping of imported products when the Indian entrepreneur goes into production'. Another reason given by the CSIR is 'unsympathetic attitude towards development and utilisation of indigenous know-how and subjecting it to unfair competition'. The Committee trust that Government will take these problems into account and find a solution thereto.

60. The Committee are surprised to note that even the public sector undertakings in the country are not fully utilising the various facilities developed in CSIR laboratories. In this connection, the Committee feel that the suggestion of the CSIR that they should be associated with purchase of know-how from abroad with a view to further development of such know-how in the country merits favourable consideration. In view of the exhortation of the D.G. CSIR that "CSIR is a good organisation. Give it work, utilise that work. You will get encouraging results", it is desirable that public sector undertakings should make maximum utilisation of the technology and know-how developed in the CSIR's laboratories/institutes and also associate the CSIR with import of know-how from abroad.

61. The extent to which the craze for foreign know-how is prevalent in the country is evident from the fact that although the CSIR had developed indigenous know-how for colour T.V. and the same was ready for commercial exploitation, the indigenous technology was not utilised and import of colour T.V. was allowed. The Committee feel that it is high time that the country were to give up the tendency to go in for imported technology when indigenous technology were available or could be easily available. The Committee feel that in

view of the fact that a vast scientific and technical manpower is available in the country and the Indian Scientists and Engineers are second to none in talents and have made significant contribution in the field of scientific research and technology in foreign countries, there is no reason why with determination, significant break-through in this direction cannot be achieved.

62. A common point of criticism against CSIR is that the laboratories under the Council are concentrating on developing such processes which serve the elite section of society and little attention has been paid towards the development of technology to benefit people belonging to economically weaker sections of society like artisans, small and marginal farmers, etc. It was admitted by the Director General, CSIR in evidence before the Committee that the scientists engaged in developing technology for economically weaker sections of society form a very small proportion of the total number. The Committee, however, note that CSIR is now paying attention to the needs of economically weaker sections and rural areas. It has compiled a list of technologies to be developed for the economically weaker sections of society, and it will try to use them in villages. The Committee desire that CSIR should not only pay still greater attention to the development of technologies which may benefit the hitherto neglected sections of society, but also undertake a programme to popularise the same in the rural areas. The Committee desire that for carrying these technologies to the remote rural areas, cooperation of voluntary organisations engaged in the work of rural development should be taken.

63. The Committee are concerned at the lack of coordination between the CSIR and NRDC. According to the CSIR-NRDC agreement, it was expected that the CSIR would liaise with NRDC for the purpose of knowing whether and the extent to which the results of research passed on to NRDC were being utilised. But it is surprising that neither did the NRDC submit nor did the CSIR ask the NRDC to submit the returns required under the agreement. The Committee would like to be apprised of the reasons for this lapse. The Committee desire that immediate steps should be taken by Government in order to ensure better coordination between the CSIR and NRDC, so that the results of research of CSIR are released for commercial exploitation as early as possible and CSIR kept informed of the necessary data relating to the same.

64. Alongwith the annual statements required to be submitted by the NRDC to the CSIR, they (NRDC) were also required to send data

on production and sale (process and party-wise) which NRDC did not submit. The Committee wonder how the CSIR in the absence of data on production and sale could verify the correctness of the statements and thus check whether the royalty given to them was in order. The data should be forthcoming in future.

Pilot plants

65. According to audit, the Laboratories|Institutes under Engineering Science Groups were running 5 pilot plants for periods ranging from 8 to 20 years. The plants were established with specific objectives, but no review of the utility and usefulness of the plants justifying their continuance had ever been made by any expert Committee.

66. The Audit para has further pointed out that two pilot plants (Optical glass and magnesium) which were marketing their products had been running in deficit. The deficit in respect of optical glass pilot plant, as worked out by OGCRI, Calcutta accumulated to Rs. 35.65 lakhs during the period 1970-71 to 1979-80. In the case of magnesium pilot plant of National Metallurgical Laboratory, Jamshedpur, the recurring expenditure for the years 1972-73 to 1979-80 aggregated Rs. 238.64 lakhs whereas the receipts amounted to Rs. 74.83 lakhs. The magnesium pilot plant had registered its annual installed capacity as 200 tonnes whereas its average production worked out to be 19.87 tonnes per annum only (excluding production of 62.93 tonnes achieved during 6 months March to September 1977 when Bharat Aluminium Company Limited ran the plant.

67. To a question whether the production of pilot plants had achieved optimum level during 1980-81 and 1981-82, the CSIR in a note stated as follows:

“CSIR is basically a research organisation and it is not within its Rules and Regulations to run an industrial establishment on commercial lines. As such, CSIR was keen from the beginning to hand over the plant, together with the relevant technology, to any competent organisation, preferably in the public sector, for commercial operation to meet the nation's demands for this strategic metal (magnesium) Attempts were made to transfer the existing plant and technology to various organisations such as, Bharat Aluminium Co. Ltd., Ordnance Factory H.A.L. Hindustan Zinc, Mishra Dhatu Nigam, etc. None of these

organisations agreed to take over the project. Obviously, they were concerned with the economics of the plant based, as it is, on an installed capacity which was not *ab-initio* designed to operate on the basis of its commercial viability, but only to demonstrate the technical adequacy of the process.

In the absence of ready offers to take over the plant, CSIR has, therefore, of necessity, to continue to operate the plant in spite of its uneconomic working below the assessed capacity. Further, during the past few years, the plant has been operating under a number of constraints, such as inadequate power supply with frequent break-downs, insufficient manpower, limited operating spares, shortage of essential material like low sulphur furnace oil due to non supplies from Gauhati Refineries and transport bottlenecks. Due to these factors, the plant could be operated only in short spells. Thus, the production during 1980-81 and 1981-82 was not satisfactory due to factors not within the control of CSIR. Concerted efforts and negotiations are going on with a view to transferring the plant and the technology to a suitable party. The production figures for the years 1980-81 and 1981-82 are as under:

1980-81 6.686 tonnes

1981-82 4.151 tonnes”.

68. The Director General, CSIR stated during evidence:

“We have taken decisions. For example, the major one was the Magnesium project which we were asked to set up because Defence Ministry said that we must develop a process. So, It was set up and ultimately last year we negotiated for 4 or 5 years with several parties and finally we thought that it was not getting anywhere, we invited tenders, we had a tender from Nirlon for purchase of this pilot plant ‘on as-is-where-is’ basis. We hope to finalise this. So, this will be closed down.”

69. The Committee enquired if there was any system to review the pilot plants periodically. The witness replied as follows:—

“For example, the Magnesium plant was reviewed in great detail. Again, after reviewing this we consulted the Department of Defence Production and the Department of

Commerce and we decided that we close down this pilot plant. The same thing is being done with regard to the optical plant. These are the two plants only."

70. The Committee note that the laboratories/institutes under the CSIR have been running a number of pilot plants. As CSIR is a research organisation and it is not within its rules and regulations to run an establishment on commercial line, it is expected to hand over the plants together with the relevant technology to any competent organisation for commercial operation. The Committee are however, surprised to find that some of these pilot plants have been running for periods ranging from 8 to 20 years and these were neither handed over to any organisation nor was a decision taken to wind up these plants in case of there being no-takers for the same. The result has been that some of these plants have entailed on Government with heavy losses. For example, the optical glass pilot plant had accumulated a loss of Rs. 35.65 lakhs during the period 1970-71 to 1979-80, and the deficit in case of magnesium pilot plant amounted to Rs. 163.81 lakhs during the period 1972-73 to 1979-80. The Committee have been informed that these plants were offered to establishments including public section undertakings but none agreed to take over these plants and hence it has since been decided to wind up the same. It is disappointing that CSIR has taken such a long time to take this decision. The Committee recommend that CSIR should periodically review the working of the pilot plants and in case it is found that these plants have outlined their utility purpose and there are no buyers for the same, a decision to wind up these plants be taken without loss of time so as to avoid unnecessary losses.

Role of young scientists in CSIR

71. The Committee enquired if it was a fact that younger scientists were being denied the opportunity of getting sufficient funds for their projects leading to frustration among them. In reply, Director General, CSIR stated before the Committee:

"As regards the participation of younger scientists, we have written specially to Directors to find out which are the ways in which the younger scientists are involved and could be involved. We intend to discuss this in some detail in the next Director's Conference. We are very much conscious that the whole organisation will benefit if the younger scientists were involved much more. Occasionally from some places the reports come about the type of things that you have mentioned. But with due

respect, I would say that this can be an exception here and there, not the rule. We are an open system. We cherish the younger scientists. About the bossism in the CSIR, some people can complain. But those people who complain are generally in a minority. They are much more vocal. In many cases, I have found by personally looking into them that these are the people who are not working satisfactorily. They have not got the capacity to work and they will go and raise a big noise about it. They always can get 10 to 12 people who are not working satisfactorily in the laboratories."

72. When asked if under the present system, the Director had a free choice to allocate diversty money from one project to another project, the witness replied:

"It is in his discretion. But he exercises the discretion in consultation with the Executive Committee. If it is a minor adjustment, he need not go to the Executive Committee".

The witness further stated:

"Knowing my directors, I do not think that any such thing is done on any *mala fide* or individual preference basis....I can put 10 different controls and it will only slow down the research work."

73. Asked about the number of Scientists going abroad or being sent to Management Institute for refresher courses; the Director General, CSIR stated:

"We have now requested for special permission—earlier anyone who has not served for five years could not be sent abroad that we should be able to send abroad people who work for a year or two. We want our scientists to be abreast to modern management technique, specially from the point of view of project accounting, the utility of time and optimisation. I did personally also work with the Administrative College of India devising some courses. Our Directors at that time went for a short course of about three days only. We have sent quite a number of middle level scientists from scientists 'C' & 'E' level from several laboratories to the Staff College."

74. The Committee enquired if the persons included in the Executive Committee were nominated by the Director, Director General, CSIR stated in reply:

“Not by the Director. The Sarkar Committee laid great emphasis that the management should be internationalised. Before that, we had an Executive Committee in which no scientist from the laboratory was there. The President was from outside. It was the Sarkar Committee which changed it and said that the Executive Committee would have the Director as Chairman, three outside members and three scientists by rotation for a period of two years. So, no scientist serves continuously for more than two years. Secondly, the nominations are not made by the Director; the nominations are made by the Governing Body of the CSIR. The Directors are requested to send a list of names; they send the names and we go through that list. I myself have gone through that list last year. Scientist-C has served; occasionally Scientists-B also have served on the Executive Committee.”

75. When asked if a number of scientists had left CSIR after one or two years, Director General, CSIR stated:

“They are not many. Once we checked one or two laboratories and we found that there was no abnormal leaving of the people. One of the functions is also to train scientists and we want them to go to industries for training so that we get fresh blood. The people are going for better prospects. The people who have left out of frustration will be very limited.”

76. CSIR is a research organisation and it is essential that in such a research organisation having a nation-wide net work, young and bright scientists are given all encouragement so as to contribute their best to the scientific research and advancement in the country. There are wide-spread complaints that young scientists are being ignored in the research work in the Laboratories/Institutes under the CSIR, that the projects allotted to the younger scientists are being starved of funds and the funds allocated to the projects under these scientists are being arbitrarily transferred to other projects which are being sponsored by senior scientists. It has also been alleged that younger scientists are not being included in the executive committees of different Laboratories and this has contributed to the frustration among them causing often their exit from these laboratories in large numbers.

Although the Director General of the CSIR has denied these allegations in his evidence before the Committee, the Committee feel that these are not wholly without substance. From the list of members of executive committees of different laboratories furnished to the Committee, the Committee find that there are a number of laboratories like the Central Drug Research Institute, Lucknow, Central Food Technological Research Institute, Mysore, Central Leather Research Institute, Madras, Central Electro Chemical Research Institute, Kalaikudi, etc., where not a single scientist below the age of 40 years has been nominated to the executive committee during the period 1-4-1976 to 31-12-82. The Committee need hardly emphasise the imperative need for CSIR to ensure that the scientists particularly younger ones are given every possible encouragement and facility so as to enable them to complete their research work and there should be no room for any feeling of frustration among them. The Committee would like the C.S.I.R. to ensure proper representations to the younger scientists in the executive committees of the Laboratories/Institutes under it so as to inculcate a feeling of participation among these scientists. The deliberations of the Executive Committee should also be conducted in such a manner as to infuse a feeling of participation among the scientists. The Committee also desire that the working conditions of the scientists under the CSIR should be suitably improved and adequate avenues of promotion provided to them so as to attract the best talent in these laboratories.

NEW DELHI;
September 5, 1983

Bhadra 14, 1905 (S).

SUNIL MAITRA,
Chairman,
Public Accounts Committee.

APPENDIX

(Vide Para 1)

Council of Scientific and Industrial Research—Engineering .. Science Group

1. Introductory

1.1 The Council of Scientific and Industrial Research (CSIR) was constituted in 1942 as a society registered under the Registration of Societies Act, 1860 for fostering industrial development in the country. Its main objectives are:

- to undertake scientific and industrial/applied research of national importance directed towards continuous improvement of indigenous technology and adaptation and development of imported technology;
- to utilise the results of research towards the development of industries;
- to establish and award research fellowship and finance specific researches; and
- to establish, maintain and manage laboratories, workshops, institute, etc. for the achievement of its objectives.

1.2 Its affairs are administered, directed and controlled by a governing body consisting of a Director General (who is *ex-officio* Chairman of the governing body), five directors of the laboratories who are Chairman of the Co-ordination Councils pertaining to each of the five groups of sciences (mentioned in sub-paragraph 1.3), Member (Finance) and three experts nominated from outside the CSIR.

1.3 The research establishments of the CSIR are divided broadly into 5 major disciplines, viz. (i) physical and earth sciences; (ii) chemical sciences; (iii) biological sciences; (iv) engineering sciences; and (v) information sciences.

The following 8 laboratories/institutes, which fall under the “engineering sciences group” have been reviewed in audit.

- (i) Central Glass and Ceramic Research Institute, (CGCRI), Calcutta
- (ii) National Metallurgical Laboratory (NML), Jamshedpur
- (iii) Central Mining Research Station (CMRS), Dhanbad
- (iv) Central Mechanical Engineering Research Institute (CMERI), Durgapur
- (v) National Environmental Engineering Research Institute (NEERI), Nagpur
- (vi) National Aeronautical Laboratory (NAL), Bangalore
- (vii) Regional Research Laboratory RRL, Bhubaneswar.
- (viii) Structural Engineering Research Centre (SERC) Roorkee and Madras.

The executive committee constituted (for each laboratory/institute) under the rules and regulations of the CSIR is responsible for the control and general direction of the laboratory/institute.

2. *Finance, accounts and audit*: The funds of the CSIR consist essentially of grants given by Government and these amounted to Rs. 251.70 crores during 6 years 1974-75 to 1979-80. The accounts of the CSIR are audited by the Comptroller and Auditor General of India under section 29(1) of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971, and its audited accounts together with the reports thereon are placed before Parliament. The laboratories/institutes functioning under it are provided with funds by the CSIR. A summary of the receipts and payments of the laboratories/institutes of the engineering sciences group during 1974-75 to 1979-80 is given in the statement below:

| | 1974-75 | 1975-76 | 1976-77 | 1977-78 | 1978-79 | 1979-80 | Total |
|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| <i>Receipts</i> | | | | | | | |
| (Rupees in Lakhs) | | | | | | | |
| Opening balance | 94.05 | 60.24 | 113.12 | 199.81 | 243.80 | 199.06 | 94.05 |
| Grants from CSIR | 722.02 | 832.59 | 956.72 | 947.29 | 997.61 | 1083.34 | 5539.57 |
| Other grants | 6.33 | 5.50 | 5.34 | 0.98 | .. | 1.00 | 19.39 |
| Miscellaneous receipts | 94.60 | 133.35 | 138.93 | 158.93 | 151.11 | 124.66 | 754.05 |
| Deposits and advances | 62.75 | 107.99 | 144.97 | 203.17 | 227.56 | 296.10 | 1042.54 |
| Suspense and remittances | 124.44 | 162.92 | 169.72 | 83.56 | 86.02 | 77.38 | 704.00 |
| TOTAL | 1,104.19 | 1,302.59 | 1,521.27 | 1,553.74 | 1,706.10 | 1,781.78 | 8,153.64 |
| <i>Payments</i> | | | | | | | |
| Pay and allowances | 420.51 | 478.22 | 478.43 | 519.83 | 574.03 | 586.89 | 3057.91 |
| Contingencies | 47.01 | 58.08 | 66.06 | 56.94 | 57.05 | 89.15 | 374.29 |
| Maintenance of staff quarters | 33.75 | 23.51 | 23.59 | 34.15 | 29.55 | 34.92 | 179.47 |
| Chemicals, apparatus and equipment for Research | 77.17 | 83.40 | 100.91 | 101.90 | 110.18 | 100.26 | 573.82 |
| Deposits and advances | 73.15 | 77.23 | 118.93 | 176.27 | 258.74 | 301.47 | 1005.79 |
| Capital expenditure | 219.38 | 229.32 | 287.98 | 264.07 | 325.05 | 340.98 | 1666.78 |
| Pilot plants | 35.61 | 62.91 | 55.33 | 63.35 | 41.71 | 37.87 | 296.78 |
| Superannuation pensions | 3.15 | 4.23 | 9.26 | 6.67 | 12.37 | 13.65 | 49.33 |
| Miscellaneous | 4.09 | 5.79 | 4.99 | 7.54 | 11.19 | 4.68 | 38.28 |
| Suspense and remittances | 130.13 | 166.78 | 175.98 | 79.22 | 87.17 | 75.67 | 7144.95 |
| Closing balance | 60.24 | 113.12 | 199.81 | 243.80 | 199.06 | 196.24 | 196.24 |
| TOTAL | 1,104.19 | 1,302.59 | 1,521.27 | 1,553.74 | 1,706.10 | 1,781.78 | 8,153.64 |

3. Planning and execution of research and development projects

3.1 Projects to be undertaken, by the laboratories/institutes are formulated and approved by their respective executive committees which are assisted by scientific advisory committees constituted by them for the purpose. Under the bye-laws of the CSIR, the executive committees are expected to meet once a month, but in any case, not less than 4 times in a calendar year to carry out their functions, particularly those relating to formulation and approval of research and development plans, allocation of resources, evaluation of their performance, etc. The executive committees had, however, been meeting far less than required and the meetings of scientific advisory committees were also few. In February 1980 a Research Advisory Council consisting, among others, of scientists from outside the Institute/Laboratory concerned, was constituted by the CSIR in replacement of the scientific advisory committees, with a view to making the system more broadbased and objective. It was prescribed that the Council should meet at least twice a year, in respect of each laboratory/institute. But meetings of the Council during 1980 had also fallen short of the required number. The number of meetings held by the respective committees/Council in respect of 8 laboratories is indicated below:

| | Executive committee meetings held during January 1974 to December 1980 (7 years) | Scientific advisory committee meetings held during January 1974 to December 1979 (6 years) | Research advisory council meetings held during February to December 1980 (11 months) |
|-------------------------------|--|--|--|
| 1. CGCRI, Calcutta | 17 | 2 | — |
| 2. NML, Jamshedpur | 15 | 3 | 2 |
| 3. CMRS, Dhanbad | 22 | 6 | 1 |
| 4. CMERI, Durgapur | 21 | 3 | 1 |
| 5. NEERI, Nagpur | 22 | 6 | 1 |
| 6. NAL, Bangalore | 21 | 7 | 1 |
| 7. RRL, Bhubaneswar | 24 | 5 | 2 |
| 8. SERC, Roorkee and Madras | 14 | 12 | 1 |

The CSIR stated (October 1981) that the non-holding of meetings did not result in in-adequate and ineffective control over the

laboratories institutes and that every endeavour was being made to hold the meetings of the committees to be prescribed extent.

3.2 A study team of 7 members on project budgeting, costing and audit procedures set up by the CSIR in 1975 recommended in its report of April 1976 that a project budgeting system should be developed so that it would form a scientific basis for funding the laboratories and exercising management control. A system of project budgeting had been formally introduced in the 8 laboratories of the engineering sciences group from different years, starting from 1975-76. However, except in the case of NAL, Bangalore the project budget did not give information about the progressive actuals relating to various components of each project up to the end of the year, and during previous year compared with the estimated expenditure on each component during the currency of the project, etc. Further, no reports comparing actuals with estimates in the project budget were made available to the executive committees. As a result, the project budget estimates continued to give nothing more than an arbitrary break up among the projects of estimates under the conventional heads viz. salaries, contingencies, etc. Consequently no fruitful utilisation of the project budget estimates could be made for assessing costs for future planning and completion of projects-in-progress, and the purpose of introducing project budget, with a view to relate expenditure to the needs of individual projects instead of to the assumed needs of tools and manpower for the entire Institute/Laboratory, was defeated. The following three instances would serve to illustrate the above observation it:

- (i) In the project-wise budget of the CGCRI, Calcutta, provision for consumables in respect of various projects in the revised estimates 1979-80 aggregated Rs. 14.43 lakhs initially. But the figure was later (December 1979) limited to Rs. 8.50 lakhs because provision for consumables had been made to this extent only in the traditional budget. No attempt was, however, made to reallocate the reduced provision of Rs. 8.50 lakhs for consumables among the various projects in the order of their relative priorities.
- (ii) In the project-wise budget of the RRL, Bhubaneswar, the total provision for capital equipment in respect of

various projects in the revised estimates 1979-80 was initially for Rs. 57.34 lakhs. But the amount was later (December 1979) restricted to Rs. 35.00 lakhs, because provision for this amount only had been made in the traditional budget. The reduced provision of Rs. 35.00 lakhs for capital equipment had not been reallocated among various projects in the order of their relative priorities.

- (iii) In the project-wise budget of CMRS, Dhanbad, provision for capital expenditure (works, furniture and fittings, vehicles, models and exhibits, workshop stores, construction of staff quarters), chemicals, apparatus and equipment for research in respect of various projects in the revised estimates 1979-80 was initially estimated at Rs. 21.06 lakhs. But whereas it was subsequently (December 1979) reduced to Rs. 9.10 lakhs, no attempt was made to reallocate the reduced provision itemwise among the various projects in the order of their relative priorities.

The Council stated in respect of the instances cited above that the reduced provisions were reallocated by the Directors, but the available records did not indicate any such reallocation.

3.3. The Public Accounts Committee had recommended in its 75th Report (4th Lok Sabha 1968-69) the introduction of cost analysis of processes meant for commercial exploitation in all the laboratories/institutes in order to have an idea of the expenditure incurred on such processes. However, excepting the NAL, Bangalore, no other laboratory/institute in the engineering sciences group had introduced a system of project costing. Thus, the introduction of project budget estimates, even if they were to be prepared independently and not be breaking up the estimates under the conventional heads, as at present, has not rendered the budgetary process any more scientific or realistic, and the recommendations of the PAC have not, in substance, been implemented.

The CSIR stated (October and December 1981) that:

- it was neither possible nor necessary to introduce project costing in all laboratories;
- in the absence of adequate facilities in the laboratories, the progress in regard to project costing was bound to take time;

- the recommendations of the study team of the CSIR in regard to recommendations of the Public Accounts Committee had to be considered for adoption in the light of situation obtaining in each laboratory; and
- efforts were being made to introduce project budgeting and costing in a gradual manner.

3.4 The position in respect of various projects undertaken during 6 years 1974-75 to 1979-80 by 7 laboratories is indicated below; as project records in respect of CMRS, Dhanbad, were not being maintained by the laboratory, its figures for 1974-75 to 1979-80 have not been included.

| Year | Number of projects carried over from previous year | Number of new projects taken up during the year | Number of projects completed during the year | Number of projects abandoned during the year | Number of continuing projects at the end of the year |
|---------|--|---|--|--|--|
| 1974-75 | 308 | 143 | 90 | 31 | *330 |
| 1975-76 | 345 | 114 | 75 | 18 | 366 |
| 1976-77 | 366 | 139 | 102 | 24 | 379 |
| 1977-78 | 379 | 161 | 128 | 19 | 393 |
| 1978-79 | 393 | 142 | 128 | 33 | 374 |
| 1979-80 | 374 | 64 | 139 | 16 | 283 |
| | 2,165 | 763 | 662 | 141 | 2,125 |

(*Information for RRI, Bhubaneshwar for 1974-75 was not available and hence has not been given).

The CSIR stated (December 1981) that action had been initiated to review all projects continuing for long.

Some important points noticed in a test-check in audit (March-June 1980) of the accounts/records of the projects undertaken by the laboratories/institutes are mentioned below:

(i) The laboratories/institutes undertook various projects on the basis of approval given to them by the respective executive committees. However, the proposals put forth to the committees contained information mainly on overall objectives, target date for completion, etc. but did not contain data on cost-benefit analysis, techno-economic feasibility study, demands or needs of the industries, etc. In fact, there was hardly any record to show why a

particular project was selected by the executive committee. Further, the study team had recommended, inter alia, the establishment of a project planning, monitoring and evaluation cell consisting of a scientist, an economist, an accountant and a management expert with a view to concurrent monitoring and evaluation of projects taken up for research, as well as for planning future work. Although project planning, monitoring and evaluation cell consisting of a scientist, an economist, an monitoring and evaluation cells had been created in 4 laboratories CGCRI, Calcutta (1976-77) NEERI, Nagpur (January 1978), CMRS, Dhanbad (1975) and NAL, Bangalore (January 1977) in none of these laboratories/institutes were the cells manned with the minimum strength of experts for the purpose in view, and their functions were mostly clerical. Even the accountant was only on the strength of the cell of one laboratory, viz. NAL, Bangalore.

The CSIR stated (October 1981), that though the proposals before the executive committee might not contain all the information, the discussions in the meetings were comprehensive and decisions were taken having regard to the goals and objectives. The fact, however, remains that between 1974-75 and 1979-80, 2165 projects were required to be reviewed for which only 156 executive committee (up to December 1980) and 44 scientific advisory committee meetings (up to December 1979) were held.

(ii) Out of 141 abandoned projects testchecked in audit, 16 were in operation for over 5 years, 26 from 3 to 5 years, 76 from 1 to 3 years and the remaining 23 projects were abandoned within one year. According to CMERI, Durgapur lack of adequate initial planning and survey before undertaking the projects were contributory factors for abandonment of projects. The laboratories/institutes of the CSIR had stated (May-June 1980) that these projects were abandoned due to lack or non-availability of machinery, equipment and other facilities, availability of products/goods in the market through efforts of others etc.

The CSIR stated (December 1980 and October 1981) that the projects were abandoned for several other reasons as well such as (i) results were not encouraging (ii) projects were not viable, (iii) similar works were in progress elsewhere, (iv) though successful, processes were not acceptable due to economic viability (v) lack of subsequent enthusiasm by the sponsoring parties etc. The CSIR added (December 1980) that the expertise generated

out of the abandoned projects was being utilised/would be utilised as and when need would arise. However, against 141 projects abandoned, the expertise generated in respect of only 8 projects was published in science journals and in 7 other projects the expertise appeared to have been utilised in certain processes or otherwise.

(iii) The CMRS, Dhanbad, did not keep any record of the research and development projects approved during 1974-75 to 1978-79. The annual reports of the CMRS also recorded the progress of only those projects, on which significant progress had been made during the year. Out of 79 projects approved by the CMRS during 1974-75 to 1978-79, according to the list prepared by Audit of those approved projects in respect of which travelling allowance and daily allowance were paid to the staff engaged thereon. 16 (including 8 converted into sponsored projects) were completed, 6 were abandoned/held in abeyance, 8 (including 2 converted into sponsored projects) were in progress. The CMRS was not able to furnish information on remaining 49 projects including the expenditure incurred thereon (September 1981).

(iv) The project 'household pump' was taken up by CMERI, Durgapur, in August 1974 and was completed in June 1975. The same project was started by NEERI, Nagpur, in August 1976 and the work was carried out up to April 1978 (expenditure incurred not available) when it was abandoned on the ground of duplication of efforts. This apparently is a case of lack of coordination between the two institutes.

(v) The CMRS, Dhanbad undertook during 1974-75 to 1979-80, 864 projects sponsored and financed by outside organisations. Under the agreement, the sponsoring industries were required to furnish to the CMRS within 90 days their intention for commercial exploitation of the process know-how. No such option was furnished by 67 parties and royalty became payable to the CMRS from 48 parties for released processes for a period ranging from 5 to 14 years. However, royalty, amounting to Rs. 1.32 lakhs, was realised up to 31st March 1980 from only 13 parties.

4. *Utilisation of the results of research*

4.1. Processes developed by laboratories/institutes are mostly released to the industries for commercial exploitation through the National Research Development Corporation (NRDC) on payment by the industries of lump sum, premia and recurring royalty for

periods ranging from 5 to 14 years at the prescribed rates on the sale production value, the proceeds being shared by the CSIR and the NRDC in the ratio of 70:30. The premia and royalty earned by the CSIR during 7 calendar years (1974 to 1980) in respect of the engineering sciences group of laboratories/institutes amounted to Rs. 70.67 lakhs (premia: Rs. 3.27 lakhs and royalty: Rs. 67.40 lakhs). Till the end of 1979-80, 8 laboratories/institutes referred 295 processes to the NRDC, of which 26 processes had been dropped or withdrawn subsequently, 13 were released free to the industries, either due to lack of demand from the industries or for the growth and development of small scale industries and 147 were released on payment of premia and royalty. The remaining 109 processes had not yet been released by the NRDC for commercial exploitation (June 1981).

4.2 According to the agreement executed by the NRDC with the industries production was to be started using these processes within one year. Out of 147 processes, only 39 were utilised for production and in respect of the remaining 108 processes, production had not been started (June 1981) although the prescribed period of one year had expired in all these cases.

The CSIR stated (November 1980) that these processes could not be exploited commercially due to various factors, viz. (i) incompetence of the entrepreneurs, (ii) market demand pattern, (iii) financial constraints for further development work, (iv) difficulties in generating investment capital, etc.

The CSIR stated (October 1981) that the basic responsibility for the releases of the processes rested with the NRDC, which would take appropriate action in the matter.

4.3 According to the CSIR-NRDC agreement it was expected that the CSIR would liaise with the NRDC for the purpose of knowing whether and the extent to which the results of research passed on to the NRDC were being utilised. But neither did the NRDC furnish, nor did the CSIR ask from NRDC the required returns relating to (i) processes passed on to the trade, (ii) status of technological development by the licencees, problems/difficulties encountered by them and (iii) reports of biannual inspections of production activity and accounts of the licencee firms for purpose of royalty.

The industries were remitting royalty to the NRDC half-yearly along with production/sales statements. The CSIR's share of royalty was being remitted by the NRDC to the CSIR annually along with

statements showing (i) the name of the process, (ii) the name of the party, (iii) period of royalty, and (iv) the amount of royalty. Copies of these statements were also being sent by the NRDC to the laboratories/institutes concerned. The NRDC was also required to send annually to CSIR, data on production and sale (process and partywise). These data were not, however, being received from NRDC. As such neither the CSIR nor its laboratories/institutes could check the royalty statement with reference to production/sale data. It also could not ensure payment of regular instalments of royalty by the NRDC/Industries. In respect of 39 processes, which had been utilised for production purposes regular instalments of royalty were not received in 29 cases.

4.4 NML, Jamshedpur, had not referred 4 processes (completed during December 1971 to December 1977) to the NRDC for commercial exploitation. In 3 cases the technology was being imported by the user industries and in one case the process was developed only up to laboratory scale and could not be pursued further due to non-availability of requisite facility for scaling up either at the laboratory or elsewhere in India.

5. *Pilot plants:* The laboratories/institutes were running 5 pilot plants for period ranging from 8 to 20 years. These plants were established. In the past with specific objectives, but no review of the utility of these plants to justify their continuance had ever been made by any expert committee. Two pilot plants (optical glass and magnesium) which were marketing their products had been running in deficit. As assessed by the CGCRI, Calcutta, the deficit in respect of the optical glass pilot plant accumulated to Rs. 35.65 lakhs during the period 1970-71 to 1979-80. In respect of the magnesium pilot plant of NML, Jamshedpur the recurring expenditure (excluding depreciation) for the years 1972-73 to 1979-80 aggregated Rs. 238.64 lakhs whereas the receipts amounted to Rs. 74.83 lakhs (receipts Rs. 3.63 lakhs and sale proceeds Rs. 71.20 lakhs). Further, whereas the magnesium pilot plant had registered its annual installed capacity as 200 tonnes, its average production was 19.87 tonnes per annum only (excluding production of 62.93 tonnes achieved during 6 months—March to September 1977—when Bharat Aluminium Company Ltd. ran the plant).

The CSIR stated (November 1980) that in the initial years the magnesium pilot plant posed problems of developing the required para-meters for industrial scale production. It was further stated that the development of such parameters had been adequately accomplished during the initial 5 to 6 years and that during this

process which required modifications/replacements of equipment, etc. production could not obviously have been at the optimum level because of incidental shut-downs during the modifications/replacements. In addition to these technical reasons, shortage of essential raw materials/consumables like dolomite, low sulphur, furnace oil, etc. were stated to have been encountered from time to time which also caused interrupted operation of the plant leading to low production. The CSIR further reported in December 1981 that negotiations were in progress to transfer the magnesium plant to an interested industry.

In regard to the optical glass plant, the CGCRI stated (April 1981) that the main factors for the losses during the last several years had been mainly external factors, viz. erratic and irregular supply of electricity and stoppage of fuel gas in Calcutta.

Summing ups—The following are the main points that emerge:—

- The executive committees, the scientific advisory committees of the engineering laboratories, which were to formulate and approve projects to be undertaken, held very few meetings (156 and 44 meetings in all in 7 and 6 years by 8 executive committees and 8 scientific advisory committees respectively).
- No project costing, nor project budgeting had in effect been introduced in any of the laboratories except NAL Bangalore with the result that no cost analysis of any project was available.
- Out of 2928 projects taken up to end of 31st March 1980 by 7 laboratories, 141 were abandoned, 662 were completed and 2125 were still continuing (September 1981).
- The proposals put forth to the various committees did not contain certain essential data, e.g. cost-benefit analysis, techno-economic feasibility study, demands or needs of industry which would determine the necessity or viability of the projects; nor did the minutes indicate adequately the reasons for selecting particular projects.
- The abandoned projects (141) included 16 which were in operation for 5 years, 26 from 3 to 5 years and 76 from 1 to 3 years.
- Out of 295 processes referred to NRDC for commercial release to end of 1979-80, 13 were released free due to lack

of demand or for the growth of small scale industries, 147 were released on payment of premia and royalty, and 109 had not been released.

- Out of 147 processes released, 39 only were being utilised for commercial production and of the 39, regular instalment of royalty was being received only in 10 cases.
- No action had been taken by the CSIR as required of them, to watch utilisation of the processes etc. passed on to NRDC, and to watch regular realisation of royalty and premia on projects exploited commercially.
- 5 pilot plants set up with specific objectives were being continued in operation for periods ranging from 8 to 20 years without any review; 2 pilot plants (optical glass and magnesium had been running in substantial deficits and the magnesium plant had been achieved production of only 19.87 tonnes per annum against the installed capacity of 200 tonnes.

APPENDIX-II

(Vide para 10)

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

New Dehi-110001 20th July, 1982

CHIEF (ADMINISTRATION)

SUBJECT: *Meetings of the Execultive Committee.*

Dear Shri|Dr.

Kindly refer to Shri G. Chatterjee, Ex-Chief (Admn.)'s D. O. of even number dated 28th|29th January, 1982, drawing your attention to Bye--law-39 of the Rules and Regulations and Bye-laws of the CSIR which *inter alia* provides that meetings of the Executive Committee shall ordinarily be held once a month but in any case not less than four times in a calendar year and requesting you to ensure that in future the meetings are held at regular intervals. The replies received from most of the Laboratories/Institutes indicate the following main reasons for not holding the required number of meetings in a year:—

- (i) Paucity of TA funds to meet the expenditure on TA/DA etc. on external members;
- (ii) Non-availability of sufficient agenda items for holding the meetings due to the enhancement in the financial powers of the Directors; and
- (iii) Non-availability of the outside members of the Executive Committee who being busy persons and having various pre-occupations, do not react favourably to attend meeting when items for consideration are few in number and are not of pressing nature.

The matter has been examined in this office and it has been decided as under:—

- (i) That the laboratories/institutes may make specific provisions in their budget estimates for meeting the expenditure on TA|DA etc. of the members of the Executive

Committee|Research Advisory Council which would be allocated by this office apart from their normal allocations on TA|DA etc.

- (ii) If the requisite number of meetings of the Research Advisory Council are held in a year as suggested in Shri Chatterjee's D.O. of even number dated 28-29th January, 1982 to discuss the scientific programmes of the laboratory, there will be sufficient agenda items for the meetings of the Executive Committee to discuss and approve those programmes.
- (iii) The laboratories should fix a time schedule for such meetings at the beginning of the year and inform the external members in advance so that they may fix up their programmes accordingly.

I hope that you will do the needful and ensure that the requisite number of meetings of Executive Committees|Research Advisory Councils as laid down in the Rules and Regulations and By-laws of the CSR are held.

With kind regards,

Your sincerely,

(K. L. WADHAWAN)

Heads of all National Laboratories/Institutes.

APPENDIX-III

(Vide Introduction)

(Statement of conclusions/Recommendations)

| Sl. No. | Para No. | Ministry/Deptt Concerned | Recommendations Conclusions |
|---------|----------|--------------------------|---|
| 1 | 2 | 3 | 4 |
| 1 | 14 | Deptt SC & Tech (CSIR) | <p>The projects to be formulated by the CSIR laboratories/Institutes are approved by their Executive Committees which are assisted in their deliberations by Scientific Advisory Committees. The Executive Committee of each laboratory also approves the development plans, allocates resources among various projects and evaluates performance of these projects. Under the bye-laws laid down by CSIR the Executive Committees are expected to meet once in a month but in any case not less than four times in a Calendar year. However, the actual number of meetings of Executive Committees and Scientific Advisory Committees of the Laboratories/Institutes has been much less, e.g., there were only 14 meetings of the Executive Committees of the Structural Engineering Research thereon, Roorkee and Madras in 7 years (January, 1974 to December 1980). The position in respect of other laboratories/Institutes is not much better. The result has been that a very large number of projects had to be evaluated and approved at each meeting. Thus, as many as 2165 projects were</p> |

reviewed at 156 meetings of the Executive Committee i.e. about 14 projects at each meeting. When as many as 14 projects are to be evaluated on a single meeting, the evaluation can only be superficial and perfunctory. Dropping of a project or ultimately a project proving itself infructuous is in the nature of things in any research organisation. This by itself cannot be interpreted as a act of omission. The Committee would not have any occasion to make any comment had the situation been in the CSIR like this. But there is no way of knowing for sure that dropping of a large number of projects in the CSIR fits in this category. On the contrary, scrutiny and sanction of as many as 14 scientific projects on an average in a single meeting do strengthen the belief that the examination of the projects were casual and desultory. If in the end a large number of projects had to be dropped, it is difficult for the Committee to accept to argument that it is in the nature of things in such research organisation. The Committee would like to express their unhappiness at this situation. They would emphasise that the meetings of the Executive Committees and Research Advisory Committee (which has since replaced the Scientific Advisory Committees) should be held more frequently so that the projects to be taken by CSIR laboratories/Institutes are formulated with thoroughness and the progress of ongoing projects evaluated in detail. In any case, the number of meetings should not be less than that laid down in the bye-laws of the CSIR.

Deptt. of SC & Tech. (CSIR) Although a system of project budgeting had been formally introduced in 8 laboratories in the Engineering Sciences Group of CSIR, in as many as 7 laboratories the project budget does not give any information about the progressive actuals relating to various components of each project upto the end of the year and during previous year as compared to the estimated expenditure on each component during the currency of the project, etc. Consequently, the purpose of introducing project budget with a view to relate expenditure to the needs of the individual project had been defeated. The Committee are unhappy to note that although the Public Accounts Committee had emphasised the need for introducing a system of costing for the processes developed by the CSIR as early as 1966-67 and reiterated it in 1968, the system of costing has so far been introduced in 12 per cent of the laboratories only. The Committee cannot but express their displeasure at the lackadaisical manner in which the Council had acted in this regard. The Committee are of the firm view that in order to have an idea of the expenditure incurred on processes meant for commercial exploitation, determining the charges and royalty to be recovered in respect of the processes which are ultimately formed out to the industry and also to guard against the possibility of arbitrary transfer of funds from one project to another by the authorities of a laboratory, it is absolutely necessary to introduce a system of project budgeting and costing in all the laboratories at the earliest. The Committee desire that a time-bound programme should be formulated in this regard without any further loss of time. The

Committee would like to be apprised of the progress made in this regard.

3 26 **Deptt. of SG & Tech. (CSIR)** A Study Group appointed by the CSIR had in 1976 emphasised the need for establishment of a project planning, monitoring and evaluation cell in each laboratory/Institute under the CSIR for the purpose of monitoring and evaluation of projects taken up for research concurrently as well as for planning future work. The Committee are dismayed that such cells have so far been set up in four laboratories only, and even in these laboratories the cells have not been equipped with the minimum number of experts required for the purpose and these cells have been performing only clerical functions. Since continuous monitoring, evaluation and future planning are essential for the efficient functioning of any Research programme, the Committee desire that early steps should be taken for setting up project planning, monitoring and evaluation cell in such laboratories/Institutes under the CSIR where these have not been set up so far, and it should also be ensured that these cells are equipped with requisite number of experts. The Committee are of the view that budgetary Constraint should not be allowed to stand in the way of setting up of such cells and equipping them properly as these are necessary to ensure that moneys spent on all research projects are justified and well spent.

The Committee note that out of 141 abandoned projects test checked in audit, as many as 16 were in operation for over 5 years, 26 from 3 to 5 years, 76 from 1 to 3 years and the remaining 23 projects were abandoned within one year. While the Committee grant that abandonment of some projects in the field of research may be unavoidable, it is surprising that some of the unproductive or unfeasible projects were allowed to continue for as long as 5 years or even more before a decision was taken to abandon the projects. Some of the reasons given for abandonment of projects like lack or non-availability of machinery, equipment and other facilities or similar works being in progress elsewhere clearly shows that these projects were undertaken without adequate survey and planning and after undertaking these projects adequate monitoring and review was not done to see whether the projects should be allowed to continue. In his evidence before the Committee, the Director General, CSIR stated that a good research management consists in taking a decision in this regard within the first year. He also stated that in many industrial undertakings, projects were not sanctioned for more than one year. The Committee, recommend that research projects in the laboratories/institutes under the CSIR should be undertaken after adequate survey and careful examination taking into consideration all relevant factors like economic viability, availability of machinery and equipment, etc. so that the need to abandon the project subsequently may be reduced to the minimum, and after a project has been undertaken its progress should be continuously watched and a decision to drop a

project should be taken in the initial stages itself so that infructuous expenditure on abandoned projects is the barest minimum.

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Deptt. of SC & Tech (CSIR)

The Committee are surprised to note that in the Central Mining Research Station, Dhanbad, no records of the research and development projects approved during 1974-75 to 1978-79 were maintained. In respect of as many as 49 projects, requisite information including the expenditure incurred on the projects was not available. The reply furnished by the CSIR that no records were maintained because these projects were of a routine nature is unconvincing. The Committee have already recommended the imperative need for project budgeting and costing in all the laboratories/Institutes under the CSIR. The Committee desire that full records of all the projects undertaken by the laboratories/Institutes under the CSIR, should be maintained so as to give an idea about the cost benefit ratio of the projects.

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The Committee find that the project 'household pump' was taken up by Central Mechanical Engineering Research Institute, Durgapur in August 1974 and completed in June 1975. Another project on 'household pump' was taken up in August 1976 in another laboratory under the CSIR and was abandoned in April 1978 only when it came to notice that the projection 'household pump' was already in existence since 1974. This clearly indicates absence of proper co-ordination in research efforts in various laboratories/institutes

under the CSIR leading to duplication of efforts and infructuous expenditure. The CSIR has tried to explain this lapse stating that this was a minor project involving an expenditure of less than Rs. 10,000. The Committee are not satisfied with this reply. It is not the outlay in financial terms which is important but the lacuna in the system which allowed this duplication to take place and the circumstances in which the duplication could not be detected for about 4 years i.e. 1974—78. The Committee desire that the matter may be gone into with a view to evolve a foolproof system to obviate the possibility of such duplication of efforts in future.

7 59 Deptt. of Sc & Tech. (CSIR) CSIR was set up as a premier organisation for applied industrial research in the country. The Committee are disappointed to note that the CSIR has failed to make any significant impact in the development of technology for use in industry. This is evident from the fact that till the end of 1979-80, 8 Laboratories/Institutes of the CSIR had referred 295 processes to the National Research Development Corporation (NRDC) for commercial exploitation. Out of these, 26 processes had been dropped or withdrawn subsequently, 13 were released free to the industries and 147 released on payment of premia and royalty. The remaining 109 processes had not been released by NRDC for commercial exploitation till June 1981. Even out of 147 processes released on payment, only 39 were utilised for production and in respect of the remaining 108 processes production had not started although the prescribed period of one year had expired. Thus less than 50 per cent of the processes developed by CSIR were actually released for commercial exploi-

tation and production had actually started in respect of less than 15 per cent of the processes. This clearly shows that either the processes developed by CSIR were not selected properly after taking into account the requirements of the industry in the country or the CSIR has not been able to inspire the requisite confidence of users regarding the utility of its processes. The Committee feel that the existing situation is most unsatisfactory and there is a need for the CSIR to have a better rapport with the industry. The Committee urge CSIR to take necessary measures to ensure maximum utilisation of the technologies developed in its Laboratories/Institutes by reorienting its research programme, to bring it in line with the country's development programme/industry's needs. One of the reasons given by the CSIR as to why a large number of processes developed by the CSIR laboratories are not picked up by the Industry for commercial exploitation is 'dumping of imported products when the Indian entrepreneur goes into production' Another reason given by the CSIR is 'unsympathetic attitude towards development and utilisation of indigenous know-how and subjecting it to unfair competition'. The Committee trust that Government will take these problems into account and find a solution thereto.

The Committee are surprised to note that even the public sector undertakings in the country are not fully utilising the various facilities developed in CSIR laboratories. In this connection, the

Committee feel that the suggestion of the CSIR that they should be associated with purchase of know-how from abroad with a view to further development of such know-how in the country merits favourable consideration. In view of the exhortation of the D.G. CSIR that "CSIR is a good organisation. Give it work, utilise that work. You will get encouraging results, "it is desirable that public sector undertakings should make maximum utilisation of the technology and know-how developed in the CSIR's laboratories/institutes and also associate the CSIR with import of know-how from abroad.

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The extent to which the craze for foreign know-how is prevalent in the country is evident from the fact that although the CSIR had developed indigenous know-how for colour T.V. and the same was ready for commercial exploitation, the indigenous technology was not utilised and import of colour T.V. was allowed. The Committee feel that it is high time that the country were to give up the tendency to go in for imported technology when indigenous technology were available or could be easily available. The Committee feel that in view of the fact that a vast scientific and technical manpower is available in the country and the Indian Scientists and Engineers are second to none in talents and have made significant contribution in the field of scientific research and technology in foreign countries, there is no reason why with determination, significant break-through in this direction cannot be achieved.

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Deptt. of Sc & Tech (CSIR)

A common point of criticism against CSIR is that the laboratories under the Council are concentrating on developing such processes which serve the elite section of society and little attention has been paid towards the development of technology to benefit people belonging to economically weaker sections of society like artisans, small and marginal farmers, etc. It was admitted by the Director General, CSIR in evidence before the Committee that the scientists engaged in developing technology for economically weaker sections of society form a very small proportion of the total number. The Committee, however, note that CSIR is now paying attention to the needs of economically weaker sections and rural areas. It has compiled a list of technologies to be developed for the economically weaker sections of society, and it will try to use them in villages. The Committee desire that CSIR should not only pay still greater attention to the development of technologies which may benefit the hitherto neglected sections of society, but also undertake a programme to popularise the same in the rural areas. The Committee desire that for carrying these technologies to the remote rural areas, cooperation of voluntary organisations engaged in the work of rural development should be taken.

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The Committee are concerned at the lack of coordination between the CSIR and NRDC. According to the CSIR-NRDC agreement, it was expected that the CSIR would liaise with NRDC for the pur-

pose of knowing whether and the extent to which the results of research passed on to NRDC were being utilised. But it is surprising that neither did the NRDC submit nor did the CSIR ask the NRDC to submit the returns required under the agreement. The Committee would like to be apprised of the reasons for this lapse. The Committee desire that immediate steps should be taken by Government in order to ensure better coordination between the CSIR and NRDC, so that the results of research of CSIR are released for commercial exploitation as early as possible and CSIR kept informed of the necessary data relating to the same.

12 64 Deptt. of Sc & Tech (CSIR) Alongwith the annual statements required to be submitted by the NRDC to the CSIR, they (NRDC) were also required to send data on production and sale (process and party-wise) which NRDC did not submit. The Committee wonder how the CSIR in the absence of data on production and sale could verify the correctness of the statements and thus check whether the royalty given to them was in order. The data should be forthcoming in future.

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13 70 Deptt. of Sc & Tech (CSIR) The Committee note that the laboratories|institutes under the CSIR have been running a number of pilot plants. As CSIR is a research organisation and it is not within its rules and regulations to run an establishment on commercial line, it is expected to hand over the plants together with the relevant technology to any competent organisation for commercial operation. The Committee are however, surprised to find that some of these pilot plants have been

running for periods ranging from 8 to 20 years and these were neither handed over to any organisation nor was a decision taken to wind up these plants in case of there being no-takers for the same. The result has been that some of these plants have entailed on Govt. with heavy losses. For example, the optical glass pilot plant had accumulated a loss of Rs. 35.65 lakhs during the period 1970-71 to 1979-80, and the deficit in case of magnesium pilot plant amounted to Rs. 163.81 lakhs during the period 1972-73 to 1979-80. The Committee have been informed that these plants were offered to establishments including public sector undertakings but none agreed to take over these plants and hence it has since been decided to wind up the same. It is disappointing that CSIR has taken such a long time to take this decision. The Committee recommend that CSIR should periodically review the working of the pilot plants and in case it is found that these plants have out-lived their utility purpose and there are no buyers for the same, a decision to wind up these plants be taken without loss of time so as to avoid unnecessary losses.

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CSIR is a research organisation and it is essential that in such a research organisation having a nation-wide net work, young and bright scientists are given all encouragement so as to contribute their best to the scientific research and advancement in the country. There are wide-spread complaints that young scientists are being

ignored in the research work in the Laboratories|Institutes under the CSIR, that the projects allotted to the younger scientists are being starved of funds and the funds allocated to the projects under these scientists are being arbitrarily transferred to other projects which are being sponsored by senior scientists. It has also been alleged that younger scientists are not being included in the executive committees of different Laboratories and this has contributed to the frustration among them causing often their exit from these laboratories in large numbers. Although the Director General of the CSIR has denied these allegations in his evidence before the Committee, the Committee feel that these are not wholly without substance. From the list of members of executive committees of different laboratories furnished to the Committee, the Committee find that there are a number of laboratories like the Central Drug Research Institute, Lucknow, Central Food Technological Research Institute, Mysore, Central Leather Research Institute, Madras, Central Electro Chemical Research Institute, Kalaikudi, etc., where not a single scientist below the age of 40 years has been nominated to the executive committee during the period 1-4-1976 to 31-12-82. The Committee need hardly emphasise the imperative need for CSIR to ensure that the scientists particularly younger ones are given every possible encouragement and facility so as to enable them to complete their research work and there should be no room for any feeling of frustration among them. The Committee would like the CSIR to ensure proper representation to the younger scientists in the executive committees of the Laboratories|Institutes under it so

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as to inculcate a feeling of participation among these scientists. The deliberations of the Executive Committee should also be conducted in such a manner as to infuse a feeling of participation among the scientists. The Committee also desire that the working conditions of the scientists under the CSIR should be suitably improved and adequate avenues of promotion provided to them so as to attract the best talent in these laboratories.

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