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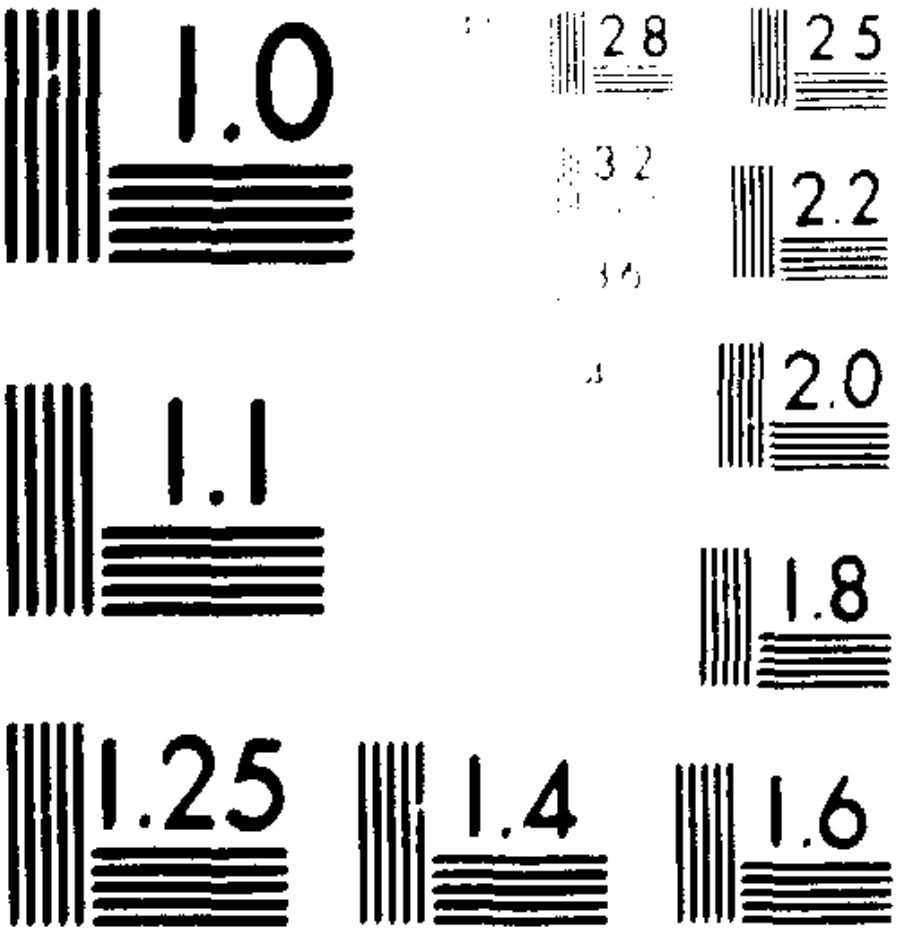

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION
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10698

PAKISTAN.

STANDARDISATION AND QUALITY CONTROL

1981

ESESJAY CONSULT LTD.
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STANDARDISATION AND QUALITY CONTROL

CENTRAL TESTING LABORATORIES

DP/PAK/73/043

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Throughout the period of our study UNIDO Expert Mr. S.el-Batoori was associated with the project and he was very helpful and we are grateful to him for his cooperation. Our Chairman found discussions with him stimulating and would like to place on record his appreciation of the fact that though the UNIDO Expert was essentially assigned to Chemical Wing he covered the entire ground of operation of CTL and the 'Preliminary report and proposal ' dated 3 November 1980 submitted by him showed that he had correctly sized up the problems and had suggested practical solutions with which the Consultants have found themselves in general agreement.

Thanks are due to Mr. Iqbal Saeed, Federal Secretary, Ministry of Industries, Acting Director CTL Mr. S.A. Baqar and Director Pakistan Standards Institution Mr. S.M.Shahid for providing information available with them. In this connection particular thanks are due to Mr. Abdul Aziz, Assistant Director CTL but for whose active help in providing essential information it would not have been possible to construct this Report.

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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

STANDARDISATION AND QUALITY CONTROL

(DP/PAK/73/(043)

SYNOPSIS

1. The objective of the project is to establish a nation wide quality control and certification marking system to facilitate efforts towards economic and industrial development of the country.

2. The primary scope of the assignment given to Consultants is to assess the functions of CTL, its activities and requirements and to develop recommendations in these matters.

3. The importance of quality contol, its meaning and significance and measures to achieve total quality control have been analysed and briefly commented upon.

4. The statutory and legislative position in regard to quality control, in particular for pre-shipment inspection and enforcement of standards have been studied.

5. Note has been taken of the various measures under contemplation, in particular the proposed ordinances for compulsory quality control in industry, registration of accredited inspection agencies for pre-shipment inspection and merger of Central Testing Laboratories and Pakistan Standard Institution under a common Director General.

6. The present arrangements for quality control in industry have been briefly covered.

7. Functions of Central Testing Laboratory have been noted and examined.

8. The proposals made for increase in staff of CTL have been noted and recommendations have been developed by the Consultants in the light of the role to be assigned to them and recommendations made for re-organisation of laboratories.

9. Proposals have been made for improving the grades of staff and laying down minimum educational and

and technical qualifications for the personnel of the CTL.

10. The need for statutory cover for operations of CTL has been examined and recommendations developed.

11. Detailed scrutiny has been made of infra structure and equipment and instrument facilities in Central Testing Laboratories and specific recommendations made for repairs, renovation and installtion of essential new instruments for chemical and physical analysis.

12. Similar recommendations have been made for CTL Laboratories at Lahore.

13. The building requirements of CTL have been examined and recommendations developed.

14. Recommendations have been made about the testing fees earned by CTL and the share of laboratory personnel in the revenues earned from testing fees.

15. Other administrative difficulties of CTL like procurement arrangements, imprest money, transport have been identified and recommendations made.

16. The state of library in CTL has been examined and specific recommendations developed.

17. The sample, analysis and testing methodologies currently in use in CTL have been examined and specific recommendations developed.

18. Proposals and suggestions have been made for training programme for laboratory personnel.

19. The reasons for industry and Government agencies not making full use of CTL have been examined and proposals made for improving the position.

20. Suggestion has been made that assistance of a management consulting firm should be obtained for a period of one year to implement the programme of improvement, streamlining and up grading of CTL and for initiating a management development programme.

21. The historical back ground and functions of Pakistan StandardsInstitution have been studied as also its organisational structure, methodologies, achievements and difficulties.

22. The significance of certification marking as an instrument of quality control has been high lighted, the present state of affairs studied and recommendations made for strengthening Certification Marking Division of PSI.

23. Recommendations have been made so that standards and certification marking gain ready and willing acceptance of industry and consumers.

24. Relationship of CTL and PSI has been analysed and suggestions made to improve the situation.

25. It has been recommended that PCSIR should play a direct role in standards formulation in regard to testing and R, & D.

26. The role and purposes of metrology and calibration services have been examined and stressed and it has been recommended that while NPSL of PCSIR is responsible for primary standardisation, other laboratories of PCSIR should develop facilities and arrangements for inter-laboratories calibration and commercial and industrial calibration.

27. The laboratories functioning in the country in private and public sector have been listed and it has been recommended that these laboratories and other common centres set up by Government and industry should be brought into the vortex of quality control.

28. While hailing the recent Government determination to enforce quality control the various efforts and proposed legislative measures have been examined and conclusions reached that while all these are steps in the right direction the objectives may fail to be achieved if the statutory and administrative measures are not properly coordinated and integrated.

29. The relationship between inspection, testing, standardisation, certification marking, pre-shipment inspection, training and propagation have been high lighted and it has been concluded that for the proposed objective of economic and industrial development and achievement of total quality

control a National Quality Control Authority needs to be set up under the presidentship of the President of Pakistan.

30. Finally the scope, purpose, objectives and broad structure of the proposed National Quality Control Authority have been suggested.

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ESESJAY CONSULT LTD.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION.

(Represented by UNIDO Senior Industrial Development Field Adviser UNDP, ISLAMABAD.)

STANDARDISATION AND QUALITY CONTROL

(DP/PAK/73/(043)

INTRODUCTION

Purpose of Assignment.

1.01 The United Nations Development Programme in response to a request from the Government of Pakistan has agreed to assist the Government in carrying out a project entitled "Standardisation & Quality Control' in Pakistan. The objective is to assist the Government of Pakistan in establishing a nation-wide quality control and certification marking system in order to facilitate its efforts towards economic and industrial development of the country. Inter alia it is also intended to establish and put into operation a national calibration service as an integral part of the national metrology service. As part of the long term objectives of the project it is intended to survey the existing quality control and certification marking system and outline a programme for its further development, to establish priorities for extension of the compulsory certification marking scheme and to work out a programme of work aimed at creating quality consciousness among producers and consumers. However, the main aim of the project is to improve and modernise the technical facilities available in CTL as a technical and instrumental

basis for development and expansion of the quality control and certification marking system. It is envisaged that this would include updating and developing sampling and testing methodology used in CTL and training of the staff in the application of new methods of testing and quality control.

2.01 In the above back ground the task assigned to the present Consultants is to assess the functions of CTL, its activities and requirements to upgrade its technical and administrative capacities. It has been envisaged that the study would in particular cover the following:

1. Assess, define and examine the legal status and functions of CTL within the institutional frame work of the standards, quality control and certification marking system existing in the country and prepare its recommendations in this respect.
2. Prepare an assessment of CTL's relations with PSI.
3. Investigate the adequacy of existing facilities and working efficiency.
4. Investigate reasons for industries not making full use of the testing facilities and suggest ways and means for motivating industries to utilise services of the laboratories to the maximum extent.
5. Determine the requirements of the industries for testing facilities and to suggest ways and means for strengthening laboratories and improving working conditions for meeting these objectives.
6. Identifying areas in which the expertise of the laboratories requires upgrading.
7. Advise on present staff structure, recommend additional requirements, fields of specialisation, qualifications and grades also to propose training programme and work out incentive schemes for promoting the operating efficiency of CTL.

8. Prepare recommendations to upgrade and develop the administrative capabilities of CTL and its institutional frame work.

2.02 It may be mentioned that this study has been contemplated in the context of the implementation of the project which has been under negotiation, agreement and partial implementation between UNIDO and Ministry of Industries, Government of Pakistan. The project (PAC/73/043/A/37) with a contemplated duration of 2 years was submitted on 20 September 1974. Annexure I gives extract from the project as originally contemplated. Subsequently the project has undergone revisions and a PC-I form was submitted incorporating the revision in 1977-78. Extracts from the project digest are given as Annexure II . Basically the short term and long term objectives remained un-altered and the revision was necessitated by the rise in the prices of equipment and infra-structure facilities required. As part of t is project 3 consultants were assigned by UNDP/UNIDO to assess the equipment and infra-structure needs of various sections of Central Testing Laboratory. The present assignment is a comprehensive study to examine CTL role, working and requirement in the context of quality control programme.

3.01 As a back drop to the project it is necessary to give an outline of the concepts of Standardisation, Certification, Metrology and Testing which have to be kept in view in making the present study.

1. <u>Standardisation</u>

Standardisation is a universal principle that operates in nature and throughout the universe. The story of standardisation in fact, begins with the story of mankind. The origin of signs, pictographs, sounds, words and language was probably the first conscious stage of man's development and utilisation of the principles of standardisation.

A common man utilises the principle of standard-

sation in his daily activities without realising that he is doing so. It plays an important role in all the spheres of human activities.

Standardisation is a true index to the economic progress. Standardisation however, in its restricted sense is applied to industry, agriculture, trade and business. Industrial and commercial standardisation refers to the formulation of standards which describe requirements, commodities, services, practices and processes. Standards come up in the form of printed documents containing information regarding form, size, dimensions, design, performance, composition, quality indices of the raw material and finished product, methods of testing and inspection and technical process for all kinds of articles, equipments and machines. Such standards are arrived at by a collective effort through different committees in which representatives of producers, dealers, consumers, industrialists, research and testing organisations, technologists, and economists, both in private and public sector participate and reach a common agreement.

The basic objectives of standardisation are as follows:

1. To speed-up the technical progress and increase the efficiency of production and productivity of labour.
2. To improve the quality of products and ensure its optimum level.
3. To ensure coordination between demand and supply.
4. To ensure health protection of the population and safety measures.
5. To develop international collaboration in economic, technical and cultural fields.
6. To use the productive capital rationally and economise material resources.
7. To improve guidance of national economy and to establish a rational nomenclature of manufactured products.
8. To establish methods and means for testing and inspection.

9. To estimaterational type and sizes of the products through unification.
10. To establish unified systems of documentation, classification and coding.
11. To establish methods and means of measurement.
12. To create favourable conditions for local and international trade and to eliminate disputes between buyers and producers.

2. Certification Marks Scheme

In order to control the quality of the products and afford effective protection to the consumer against the purchase of inferior commodities and traders against false, and unfair competition, certification marks scheme is necessary. The establishment of standards mark procedure introduces the fundamental important principles of providing a reliable and authoritative guidance to enable buyers to distinguish the comparative quality and utility of goods in relation to price and the purpose for which they are intended to be used.

Amongst others, the advantages of certification mark scheme are as follows:

1. It wins the confidence of the buyers.
2. It helps in earning the foreign exchange.
3. It acts as a common language between the buyer and seller.
4. It stands as hall markfor quality.

3. Metrology

Every day we deal with a variety of measurements. The measurement of such quantities as length, area, volume, time and weight is encountered at every step and is known to mankind from time immemorial. During the whole history of mankind people learned to measure and passed the accumulated knowledge and experience from generation to generation. As the geographical area of human exchanges widened, so the necessity to define and control the units of weights and measures grew more pressing. In order to

avoid the confusion caused by tremendous diversity and uncertainty different units and measures were laid down by ancient civilisations. Standard units were created and preserved. As a consequence of the growth in science and technology,the requirements for exact definitions and most precise measurement of these fundamental standards have become more essential. Hence the first step of metrology is establishment of accurate fundamental standards of measuring units and preservation in special conditions may spoil their accuracy. For mass-production materials must be selected to meet a wide range of varying conditions based on accurate data on the characteristics and properties of material. Moreover inter-changeable part are the key to most production/ To design the complex technical system good measurement is essential. Calibration thus is one of the keys to the development of advanced industrial economy. The basic measuring means are rarely used to calibrate reference measuring means. In practice working measuring means are used after having calibrated by the reference measuring means. The activities of standardisation and quality control are based on these measuring means. The accuracy of measuring means is essential for industrial, scientific and economic progress.

4. Testing:

The fact is that accurate standards, precise measurements and reliable testing services are sine qua non for continued industrial and scientific development of a country.

In respect of industrial products, concept of Product Testing in all its facets is an integral part of the activities of a Testing Organisation - Qualification Testing - testing a new pre-production or prototype product, Conformance Testing - on going testing to ensure that products conform to applicable standards, Compliance Testing - of the nature of investigative testing activity.

A Testing organisation as such may not be concerned

with national priorities or what are acceptable or minimum set of requirements and yet no standardisation or certification is conceivable without these priorities.

I.S.O., I.E.C., CERTICO are still grappling with the ideal amalgam of Quality Standards and Certification and the criteria for Testing Laboratories.

PRELUDE: QUALITY CONTROL.

4.01 It is necessary to high light further the concept of quality control as a back ground of the project and as its ultimate objective and also because it is in this context that the proposed institutionalisation suggested by the Consultants can be better understood.

WHAT IS QUALITY.

The term 'quality' in the context of Quality Control System has a meaning different from the ordinary sense of the word and an illustration will make the meaning clear. When we talk about the quality of a newspaper sheet we take into account characteristics of the paper such as thickness, whiteness and tensile strength. If, for example, it is too thick words will come out on the reverse; if it is not white print may not come out clearly; if weak in tensile strength it will be torn easily. The paper thus should be neither too thick nor too thin. It should be durable and acceptable to the user. The quality of a product is essentially judged not by those who make it but by those who use it. It should fit the purpose for which it is made. The characteristics by which a product's usefulness can be judged is "suitability to the objective of the one using it." These characteristics which are called 'quality characteristics' are in the case of paper expressed in mili-meter for thickness, in light reflexibility ratio or whiteness and in kg weight of each square cm for tensile strength. However, this would

not be all. Together with usefulness an important factor is safety to determine the quality of a product. Finally, in judging the quality of industrial products another important factor must be taken into account, namely 'economic efficiency.' Linked with these factors in the case of an industrial product is the factor of 'reliability' which is another name for durability and repairability. In short when we talk of quality control of an industrial product we take into account physico-chemical characteristics (such as thickness, whiteness and tensile strength in the case of paper) which are 'technical qualities' and 'demanded qualities ' i.e. usefulness, safety, reliability and economic efficiency.

4.02 Quality has various phases according to the various stages of manufacture:

a) 'Programme quality ' relates to the establishment of quality specification to meet the customers requirements.

b) 'Design quality' guaranteesthe actual design to meet the quality specification.

c) Finally, ' conformance quality' guarantees that the product conforms to the specifications during manufacture.

Quality indeed is a degree of excellence and conformance to a standard. Quality is consistency of production. Quality is concerned with maintaining the definite and uniform level of production in any manufacturing organisation. Quality control is thus a management function whereby control of quality of raw materials and finished goods is exercises with the object of preventing defective products. Quality control is a device to prevent, identify, detect and rectify errors.

SYSTEM OF QUALITY CONTROL

4.03 With the above concept a system of quality control provides the active ingredients essential to achieve domestic and export quality. A system of quality control becomes almost imperative for:

1. Improving the quality of products, including product

life and reliability,

2. Raising the productivity of manufacture process,
3. Reducing manufacturing and other costs and
4. Achieving greater marketability of products or services.

Awareness of the importance of quality and planning for it thus calls for action of Governments, industrial and commercial enterprises, professional and trade associations, academic institutions and consumers in general. In this view of the matter quality control no longer presents itself as an alternative. It becomes a necessity for the economic and social development of any country.

STATISTICAL AND ENGINEERING QUALITY CONTROL.

4.04 Quality control has statistical techniques and engineering techniques. The latter comprises:

1. Planning for quality control,
2. Process control,
3. Quality information utilisation.

4.05 Statistical quality control is the application of statistical principles and techniques at all stages of design, production, maintenance and service directed towards the economic satisfaction of the demand.

The technique of statistical quality control deals with the procedures required for maintaining a system of continuing surveillance of a respective process. They depend on statistical sampling and statistical control charts.

SCOPE OF THE PROGRAMME.

4.06 The scope of the programme of quality control is thus necessarily quite broad and encompasses individual companies or industrial units, Government's and private sector organisations as well as regional and international organisations and the role of multi-national companies and foreign companies operating in a developing country. The programme would cover in-factory programmes of receiving inspection; raw material and piece parts inspection; vendor relations; motivation of employee quality consciousness; failure analysis; reliability and environmental testing,

instruments calibration and control; maintenance of plant and equipment; final inspection for product warantee and liability; customer relations; quality assurance; quality cost analysis; quality design; management organisation and many other factors. Apart from national level this programme is expressed through Government control for quality and safety through statutes and directives, national testing facilities, standardisation, certification and quality marks programme, pre-shipment inspection, legal matrology and calibration, professional and trade associations, training programmes and academic courses, seminars and conferences, publications and projection through media, consumer resistance societies - indeed an integrated programme in the nature of a movement with Government and society both taking an active part.

MEASURES TO BE TAKEN.

4.07 For the above programme to be effective and to activate a movement the following measures are generally necessary and effective:

1. Government should spearhead the national plan through setting up requisite institutions and providing the infra-structure and statutory cover. Not only preshipment inspection is required to ensure that products are upto international standard but the quality of local manufacture has to be constantly watched and upgraded.
2. Establish and actively support and publicise a national standardisation effort through a certification programme and a recognised quality mark backed up by an effective programme of initial factory inspections; product testin , surveillance inspection and testing. Development of a national capability in legal and industrial metrology and calibration is a necessary adjunct to these efforts.
3. Create compulsion to reasonable level of quality through building specifications, purchase contract specifications etc.

In the context it may be mentioned that there atleas' wo levels of compulsion; One may be

called ' subtle compulsion ' which is obtained by specifying required quality in products and services. The other is 'hard-core compulsion ' which is obtained by the politico-technical legal activity of imposing liabilities through legal decrees. This would involve programmes of enforcement, compatible with the requirements to make the entire effort effective.

4. Establish, promote and utilise media for the whole programme, hold seminars and conferences, publish manuals and journals, invite and utilise foreign assistance with a view to making the various facets of the programme well known, acceptable and effective to all concerned.
5. Establish an extensive programme of training in national testing laboratories, national standards institutions, industrial units, industrial and trade organisation, academic institutions and in particular in the labour force.
6. Finally,develop a programme to promote public awareness of 'total quality control', involving in particular manufactures and users and consumers, particularly women for products of domestic use.

NATIONAL AUTHORITY.

4.08 In all these programmes much can be learnt from the experience of developed countries in particular Japan and other developing countries who have made some headway in the matter but it is essential to tailor the programme to national requirements and pysche.

To mount and sustain a successful total quality assurance movement on a national scale a focal point must be established in each country. In most developing countries the focal point may be provided by the Government by setting up a National Quality Control Authority. This is so because in the beginning it will be found that a national standardisation effort is the key for the development of an effective quality control

programme at the national level. Actually the concept of integrated standardisation is comparatively a new one and in may ways has surfaced during the past decade or so.

INTEGRATED STANDARDISATION.

4.09 Integrated standardisation includes the following elements:

1. Preparation of standards through promulgation and enforcement,
2. Certification and quality marking,
3. Legal metrology - weights and measures,
4. Industrial metrology and calibration,
5. Certified resources material,
6. Surveillance inspection and pre-shipment inspection for export.
7. Applied research for improving designs, materials, functioning tests, packing utilisation etc.
8. Quality control based on above desiderata.

In developed industrial societies the above elements are taken for granted but in developing countries with emerging industrialisation the base of supporting activities does not exist and these elements must be developed and integrated in an over all national plan.

QUALITY CONTROL IN INDUSTRY.

4.10 Mere laying down standards is not sufficient to attain the ideals and objectives of standardisation unless the standards are implemented properly. Quality control is the practical aspect of standardisation. The process of quality control ensures that the products, equipments, machines or services comply with the requirements of the relevant standards. Successful implementation of quality control steps up the country's production and ensures the economic security and prosperity of the country. For industries, quality control is very important, in order to estimate and raise the quality indices of the product. In industries quality control activities are performed at the following three stages:

1. Quality control at the stage of raw material.
2. Quality control during the manufacturing process.

3. Quality control at the stage of finished products.

The best quality products depend upon the successful implementation of quality control at all the three stages.

What is needed is a systemstic approach both in standardisation and implementation. To balance the economic issues with environmental and health and safety issues, makes it imperative to use the systems approach and the products must conform. When must they conform? How do they conform? And finally, how do we determine and indicate that they conform? Answer lies in a system approach.

NATIONAL CERTIFICATION PROGRAMME.

5.01 Perhaps most promising elements in the above integrated plan is the national certification and quality mark programme. If the certification system is effective it ensures a consistant quality level and promotes a higher quality level which under pain of delicensing ensures the maintenance of the necessary minimum quality level. In Pakistan we have had a national certification programme in operation for many years but unfortunately it has not proved effective for a variety of reasons and it may therefore be useful to elaborate in a simplistic manner what certification process involves. Before a company might in fact get certification a number of factory visits have to be paid to it. The initial visit is preceded by promotion and instruction in procedures. Subsequent visits are made to review the factory situation and to discuss the whole programme with management. The factory visit is aimed at looking at the actual operation with a view to assessing the quality control situation and the organisation for quality control. The laboratory is inspected which conducts tests associated with the quality of the product in order to examine the test record and the process. Actual tests may be conducted and it must be enquired whether a company itself is

quality conscious by carrying out its own tests of the product. Random samples should be selected from the warehouse and the production line and tested at an independent laboratory before a license can be issued for actual certification. Thereafter by periodical surveillance inspection and testing for continuance of the license or for its renewal the national standards body is to ensure that the factory has an adequate programme to ensure continued conformance to the standards.

QUALITY CONTROL SURVEILLANCE.

To sum up Implementation of Certification Marking Licensing (Quality Control Surveillance) calls for the following activities:

1) Control on manufacturing information
2) Control on incoming materials and storage
3) Control on manufacturing process
4) Control on final product inspection
5) Control on measuring instruments and its equipments
6) Control on corrective action quality assurance

It is necessary to realise that certification by a National Standards Institute is not a guarantee nor should it be regarded as an integral part of the factories quality control programme. It is an independent form of quality assurance providing a periodic check on the adequace of the manufacturer's production controls tests. It is in the nature of an audit of the manufacturer's operations and product. The quality of the test and evaluation process has therefore to be held high and subject to control and improvement test.

RELATIONSHIP BETWEEN PRODUCT TESTING, LABELLING AND CERTIFICATION.

5.02 Product testing, product labelling and product certification are in many ways various aspects of the same problem. Product labelling where it is a brand name or national standard mark implies that the product meets a certain set of technical requirements. Indeed where quality assurance has become a national trait, "country of origin" on labelling, as in the case of Japan, now implies a label of quality. Product certification, however, means something

more than product labelling. It not only implies that the product has been approved by some recognised body but also implies implicitly and explicitly a guarantee of some form. The whole question of product testing and product certification is an extremely complex process, particularly in the case of consumer products where the responsibilities associated with certification increase manifold.

INSPECTION

In particular, testing for a new product take place at several stages - during its development and after it is finally launched. After this product has been on the market for sometime getting feed back on the buyers' reaction is another stage of testing. The purpose of testing is to meet legal requirements, to confirm to standards, to meet specification in the design brief and to ensure consumer acceptance. It is generally necessary to carry out the test in the physical conditions in which the product will actually be used. Sometimes such conditions can be simulated in a laboratory.

Apart from standard products buyers' reactions are tested through a variety of methods such as town hall tests, trade fairs, shop tests, shop surveys controlling feed back, testing the packages etc. This last feature has special technique and both laboratories and shop tests may be necessary. In the industrialised countries physical testing services are offered by many specialised laboratories.

ADVANTAGES OF CERTIFICATION MARKING SCHEME.

5.03 A number of advantages accrue to different sectors of economy from certification marking scheme.

1. To manufacturers:

a) Streamlining of products, process and implimentation

of quality control system with its many benefits.

b) Independent audit of quality control system.

c) Reaping of production economies accruing from standardisation.

d) Production of better image of products in both internal and overseas markets.

e) Gaining of confidence and good will of trade and consumers.

f) Preference for market products by organised purchasers, Government agencies and semi-Government organisations.

g) Identification of errors and outmoded practices for improvement of technical process or management or indeed Revision of Standards.

2. To Consumers:

a) Confidence that product conforms to standards set up by any independent technical national organisation.

b) Protection from exploitation and deception.

c) Assurance of safety against hazards to life, health and property.

3. To organised purchasers:

a) Convenience in concluding contracts.

b) Elimination or reduction of the need for inspection and testing of market goods.

c) Free replacement of products found not to conform to Marks standards.

4. To exporters:

a) Elimination or reduction from pre-shipment inspection.

b) Convenient basis for making contracts.

STANDARDISATION AND CERTIFICATION.

5.04 It may be mentioned in this connection that in many industrialised countries standardisation has preceded certification but in many developing countries certification is often the primary impetus for a standards programme. It is so because certification with its statutory obligations and obvious commercial advantages gains ready acceptability. Developing countries can therefore shorten the period of achieving total quality assurance by simultaneously developing their standardisation, certification

and quality control programme.

CERTIFICATION AND QUALITY CONTROL.

5.05 While it is an essential part of a certification programme and useful in achieving quality control objectives it would be wrong to assume that certification is quality control or that quality control principles and techniques can be confined to a certification programme. Certification is an adjunct to a national standards programme. The reasons are as follows:

1. In most developing countries certification is an adjunct to national standardisation programme and is normally limited to those products for which standards are prepared and published. Standards preparation is a relatively slow process. Due to limited resources standards cannot be prepared of all products simultaneously. Statistical quality control on the other hand is not so limited and can improve the standard by the inherent improvement in the quality of the product. It is possible to miss the greatest benefit of statistical quality control if limiting quality efforts to a Certification programme alone.
2. Not all products, process and procedures for which standards are prepared are suitable for certification yet statistical methods can be employed to improve and control all products, process and procedures.
3. It is possible for a manufacturer to obtain certification on his product by demonstrating conformity to the standard while still plagued with economic inefficiency and other related ills; not so in statistical quality control.

CERTIFICATION AND PRE-SHIPMENT INSPECTION.

5.06 While the ideal situation of inspection standards based on international standard should be the norm for all

production the need for grading and minimum national standards should be recognised at the current stage of industrial development. Export inspection standard by its nature and objective is different from national standard. The inspection procedure may also be different. The AQL (acceptable quality level) or LTPD (low tolerance percentage defect) are procedures which have practical implications. Inspection differs in its nature and objective from testing and examination because in testing and examination normally the judgement does not take place whereas in the case of sample inspection the judgement is always called for against the entire lot from which the test samples have been drawn.

In most countries where certification marking is in operation and pre-shipment inspection is mandatory, for purposes of latter objective it is not customary to give exemption to Standards Institution approved factories. However, at the same time it is also usual to adopt the practice of 'reduced inspection ' in the case of such factories. Export inspection in law differs in the sense from process inspection by manufacturers or acceptance inspection by buyer.

NEED FOR FORMULATION OF NATIONAL STANDARDS.

5.07 The question, however, has been raised whether indeed there is need for specifying national standards where British, American, German, Japanese or Australian would do. The question is not easy to answer. The experience of PSI standards would tend to show that in many cases they are only a slight variation of BS, IS or some other international standard. The weakness of the administrative structure has not permitted the kind of evolution of national standards commensurate with the time and effort involved in laying down national standards. The standard for toilet soap, in Pakistan, for example, has not undergone revision for over two decades and this is by no means a solitary example and yet all developed and developing countries have been obliged to

set up their own national standards. This is not merely a reflection of a desire to keep up with the Joneses. Even countries with more or less the same level of development and of similar cultural environment like the Netherlands and Belgium cannot always agree on what is healthy or safe. Acceptable international level is yet a far cry. There is the question of differing and changing national priority. There is the problem of 'minimum quality ' versus ' comparative quality '. There is the issue of lower ' grades ' which are otherwise safe and healthy being acceptable to one buyer and not to another, if only because of the price factor. Harmonisation and tariff and non-tariff barriers impose their own compulsion. In developed countries there is a differentiation between technical standards and technical methods to test. Design versus performance standards create their own complications. The international organisation of legal metrology has to contend with differences in philosophy. However as explained above developing nations are obliged to have an integrated standardisation programme. For all these reasons national standards have a place in developing quality assurance in developing countries.

IMPORTANCE OF QUALITY MARKS

5.08 A recent British National survey of public awareness of quality marks showed that one third of the adults surveyed claimed that they looked for quality marks on products when shopping. Another 43% said they would look for quality mark if they knew more about the mark and what they represented in the assurance of quality. The strong influence which quality marks can have on consumers is indicated by these results.

The part played by quality marks in the international recognition given now to Japan as a manufacturer of quality products may be judged from the fact that nearly 14,000 factories have been issued quality marks (the JIS mark). This programme together with an extremely active

programme of quality control education, implementation and public promotion may be given the main credit for giving Japan its present position of industrial and economic leadership. The developing countries have an excellent opportunity to accelerate industrialisation by simultaneously developing their standardisation and certification programme.

5.09 CERTICO (ISO Committee) is concerned with certification as carried out by National Standards Bodies. It is concerned with certification systems and lays down guidelines. International standardisation and harmonisation are a long haul despite ISO and I.E.S. and the practical thing to do is, as in the case of RCD, to achieve reciprocal agreements first for the sake of trade and then take the long and arduous course of harmonising grades and standards. The legal difficulties involved in recognizing in international law the standard mark of other countries have to be contended with. All this, however, presupposes a competent National Standards Organisation before it seeks acceptance of its standards by others and moves on to harmonisation.

QUALITY CONTROL AND NATIONAL DEVELOPMENT.

5.10 Pakistan has now achieved a level of industrialisation that the importance of quality control particularly in the manufacturing industries can no longer be ignored. The remarkable performance in the domain of export, a growth at the compound rate of 30 per cent a year in the past three years, which is expected to reach a figure of 3250 million dollars in 1981-82, could not be sustained in this highly competitive world without assurance of quality and the control implicit in this assurance. This holds good for simple and traditional primary products and manufactures as well as for the sophisticated industries of engineering products, food, chemicals, electronics, pharmaceuticals etc. The liberal import policies, emigration of skilled and semi-skilled workers on a wide scale and their exposure to modern products and sophisticated techniques, growth of consumerism

and the choices available to consumers in a variety of products are all potent factors which make quality control essential not only for progress and development but indeed for survival of producers and manufacturers.

5.11 The realisation has begun to dawn on industrialists that standardisation and quality control have a vital role to play in raising productivity. Quality is now a serious, delicate and technical process of concern more than ever before in the history of mankind. It is everyone's business who has heart and mind on development and prosperity of his country. It has now become axionatic that to break through the vicious circle of fast growth in disruptive inflationary conditions or a slow growth with price stability in the current atmosphere of increasing protectionism in the industrialist countries, a developing country like Pakistan must necessarily lay exceptional emphasis on raising productivity through standardisation and quality control. The growth achieved in countries like Japan through emphasis on quality control and the experience that it increases profitability have provided a lesson to all developing countries and have indeed been an eye-opener. Japan has rightly claimed that Quality Control has been the key to the tremendous economic prosperity and growth that has accrred in that country in recent years. It has now become obvious that techniques of standardisation and quality control economise 'inputs' and maximise 'out puts' and thus occupy a key position in achieving productivity of both labour and capital. Quality and its related disciplines of quality control, Quality assurance, Standardisation, Certification and the whole approach to 'Integrated Standardisation' are essential to economic progress and seen in the proper perspective and given due priotity in planning and implementation, a National Quality Control System makes massive contribution to National economic development.

INCENTIVES REQUIRED FOR ACCEPTANCE OF STANDARDISATION AND CERTIFICATION MARKING.

5.12 In order that standardisation and certification marking gain ready and willing acceptance of industry and consumers various expedients have been adopted in many countries to provide the necessary incentives. Some of these are listed below:

1. Preference is given to SI marked products by organised producers, agencies of central and provincial Governments, local bodies and public undertakings for their procurement operation through mandatory instructions.
2. A price preference is accorded to SI marked goods.
3. Financial institutions and nationalised banks provide rebates in interest rates and financial assistance to industrial units obtaining SI mark.
4. Industrial units are encouraged to assure the consumers that if products bearing SI marks are found to be sub-standard they would be replaced free.
5. Products are listed which are exempted from inspection prior to export if carrying standard mark.
6. In all cases products having standard marks are subjected to reduced inspection - saving expenditure, time and labour.
7. Equipments and apparatus imported for quality control and R&D in industrial units and testing laboratories are exempt from import duties and sales taxes or are subjected to reduced taxes and duties.
8. Personnel in certified laboratories and technical institutions charged with the tast of testing, standardisation and quality control undergoing training have a preferential claim for promotion.

All these measures are obvious and have proved effective elsewhere and the consultants would recommend them for adoption in Pakistan irrespective of the

structural and organisational arrangements which may finally emerge.

GROWTH OF CONCEPT OF QUALITY CONTROL.

5.13 The growth of concept of quality control and responsibilities of quality control organisation as high-lighted above have been a gradual process and may be said to date back to the days of the first world war. Below is a list which brings out the gradual growth of the system. The concept of an integrated system and total quality assurance is of recent origin and the varied experience in may developing countries is bringing out more clearly the relative importance of various elements.

1916-1935

Product Inspection,
Development of Statistical Quality Control.

1936-1945

Product Inspection
Inspection Test Laboratories
Salvage Inspection Programme
Engineering Change Control
Inspection Discrepancy Analysis
Inspection Stamp Control

1946-1955

Production Inspection
Inspection of Test Laboratories
Engineering Change Control
Inspection Discrepancy Analysis
Inspection Stamp Control
Process Control
Preparation and Control of Inspection Procedures
Quality Publicity
Material Review

1956-1965

Product Inspection
Inspection Test Laboratories

Material Review
Engineering Change Control
Inspection Discrepancy Analysis
Inspection Stamp Control
Preparation and Control of Inspection Procedures
Quality Publicity Programme
Establishment of Quality Control Department
Tooling Development and Modernization Inspection
Material Acceptance Board
Repetitive Discrepancy Analysis
Inspection Form Control
Technical Illustrations
Competent Serialization System
Maintenance of Historical Records
Process Control Procedures and Testing
Statistical Quality Control
Information Control
Configuration Management

1966-Present

The Quality Control Department
All Product Inspection
Inspection Test Laboratories
Material Review
Inspection Form Control
Quality Publicity Programme
Technical Illustrations
Maintenance of Quality Historical Records
Statistical Quality Control
Engineering Change Control
Inspection Stamp Control
Preparation and Central Inspection Procedures
Component Serialization System
Process Control Procedures & Testing
Vendor Quality Control
Material Review Board
Quality Control Liaison

Repetitive Discrepancy Investigation, Analysis and Control
Product Reliability Analysis, Measurement and Control
Maintainability and Reliability Assurance
Establishment of Process Control Facilities and Personnel in Manufacturing Areas
Quality Audits
Vendor Product Evaluation
Detailed Periodic Quality Reports to Management
Presentation of Quality Performance Data at Floor Levels
Vendor Facility Evaluation
Maintenance of Detailed Technical Information Relating to Procured Materials and Parts
Warranty & Liability Control
Integrated Information Systems and Systems Approach.

METHODOLOGY. 6.01 With the above concepts as guiding principles and the over view of 'total quality control ' the Consultants presented a detailed interim report within 4 weeks of signing the contract outlining the methodology to be adopted by them. Effective and close liaison was maintained with the UNIDO expert/CTA assigned to CTL Mr. S.El-Batoori and the acting Director of CTL/Project Director. The Consultants have closely examined the working of CTL and PSI (Pakistan Standards Institution). The members of the team of the Consultants have studied the lay out of the laboratories both at Karachi and Lahore, the existing equipment, the technologies and methods used, the delays and difficulties currently obtaining in CTL, the list of equipment needed to be required and over-hauled, scrapped, replaced and new instruments and equipment to be added under a phased programme. The infra-structure and administrative requirements of CTL have been gone into and the reports prepared by UNIDO experts in the past for upgrading CTL have been closely studied. The recommendations made by a number of seminars held on the subject of quality control have been studied and analysed. Studies have been made of the organisational structure, practices and policies in force in most of the countries

of the Asian region. The Chairman of the Consultants visited the Headquarters of the Indian Standards Institution and held discussions with the Union Minister of Industries in India and Member, Planning Commission in India. On a subsequent visit to India he studied the set up of Test Houses in India. Several discussions have been held with Chairman of Pakistan Council of Scientific & Industrial Research, Member Technology of PCSIR and the Director of National Physical and Standard Laboratory at Islamabad. Visits have been paid to other laboratories and in particular detailed discussions have been held with the Director of the Defence Laboratories at Karachi. Liaison has been maintained with representatives of Chambers of Commerce, Trade Associations and All Pakistan Textile Mills Association.

6.02 Discussions have been held with Federal Secretary, Ministry of Industries, Joint Secretary, Ministry of Industries, Secretary Department of Industries Government of Sind, Vice Chairman Export Promotion Bureau and others. Drafts of Ordinance approved by the Government or under consideration bf Government relating to quality control, CTL and PSI have been studied. In developing the recommendations the Consultants have accordingly taken full note of the prevalent situation in the country and the new development which are in the offing in the context of quality control which ofcourse is the ultimate objective of the Project.

LEGISLATIVE MEASURES AND ARRANGEMENTS UNDER CONSIDERATION OF GOVT. OF PAKISTAN.

7.01 Conscious of the fact that institutional arrangements and mandatory procedures for quality control can no longer be postponed the Government of Pakistan have had under consideration a number of new legislative measures and arrangements and it would be pertinent to make a brief reference to them at this stage before examining the profile of CTL in depth.

7.02 The Export (Quality Control) Order 1973 and the Import & Export Control Act 1950 have hitherto been used for purposes of pre-shipment inspection. As mentioned before Agriculture Produce (Grading and Marketing) Act 1937 relates purely to agricultural products. In 1961 a certification marking scheme was introduced through Pakistan Standards Institution (Certification Marks) Ordinance 1961 Amending Act was introduced in 1975. Under this Ordinance Government assumed the powers to establish standard mark to be called the Pakistan Standard Institution Certification Mark, to prohibit misuse of such marks, to prohibit, restrict or otherwise control the export of articles of any specified description which do not bear the standard mark, to prohibit the sale of any article which does not conform to the Pakistan Standard, to inspect any operation carried on in connection withany article or process in relation to which the Standard mark has been used. This scheme was run on a voluntary basis upto 1966 during which period only two manufacturing units obtained certification marks license. In view of this poor response the certification marks scheme was introduced on a compulsory basis with effect from 1st June,1966. Under a phased programme 51 articles for export and 9 articles for domestic sales have been notified under the Ordinance.

PROPOSED ORDINANCES RELATED TO STANDARDISATION AND QUALITY CONTROL.

7.03 Some time back the Federal Export Promotion Board had set up a Committee to study the existing arrangements for standardisation and quality control. The Board which functions under the chairmanship of the President of Pakistan has demonstrated its awareness of the problem through a number of legislative measures already undertaken and some of which are in the pipeline. For example the Export Quality Control order 1973 and the Import & Export (Control) Act 1950have already been amended.

7.04 Simultaneously with existing arrangements Government proposes to assume powers to enforce pre-shipment inspection through an ordinance to be called the Inspection Agencies Registration Ordinance 1981. The rationale behind the Ordinance is that neither the Pakistan Standards Institution nor the Export Promotion Bureau have at their disposal the requisite arrangements to undertake pre-shipment inspection and Government proposes to have accredited (Registered) private Inspection Agencies to perform this function. The Ordinance and Rules have already been approved by Government and are about to be notified.

7.05 Government has realised also that the Pakistan Standards Institution which is presently responsible for certification to export goods is not organised and equipped to perform its statutory responsibility for in-plant inspection. They have therefore, proposed that while the strengthening of the institution would be considered but would take time, industrial units themselves should be charged with the responsibility of ensuring quality control of goods. They accordingly propose to issue an Ordinance to provide for quality control, training, process improvement and project development in industrial undertakings in Pakistan. The preamble of the proposed Ordinance stresses that it is expedient to provide for a mechanism for improving the quality of manufactured products and prepare for the use of appropriate technology and that it is expedient to improve the technical skill of industrial man power for up grading the quality of industrial products and increasing productivity. The salient features of the proposed ordinance are that every industrial undertaking having a paid up capital of Rs. 20 million or more shall establish within one year of the ordinance an adequately equipped and manned quality control and development cell to ensure

quality of products according to prescribed or declared specifications. The industrial undertakings will be required to spend not less than half per cent of the amount of their annual sales on the establishment and operation of the cells. The Government shall carry out periodical evaluation of the functioning of the cells in industrial undertakings. Where an industrial undertaking does not maintain a quality cell it shall pay a sum equal to 0.5% of its annual sales to a fund which would be utilised in consultation with the Federation of Pakistan Chamber of Commerce and Industry. Establishment of laboratories by Chambers and Trade Associations is also envisaged. The proposed Ordinance is not intended to confine to export goods only.

7.06 It is obvious that presently no role as such has been assigned to Central Testing Laboratory for total quality control or pre-shipment inspection nor have Government considered it feasible to strengthen and expand Pakistan Standards Insitution on a priority basis to discharge its statutory functions.

7.07 As this report was being finalised it has come to the knowledge of the Consultants that the whole matter has been reviewed by the Government and the present proposal under the consideration of the Ministry of Industries is to enact an Ordinance to be called the Pakistan Testing, Standards & Quality Control Authority Ordinance. The salient features of the scheme adumbrated in the Ordinance are as follows:

1. There shall be established an Authority with its Headquarters at Karachi to be known as the Pakistan Testing Standards & Quality Control Authority with the status of an attached department.
2. The Authority will work under the administrative control of the Secretary, Ministry of Industries, Government of Pakistan, Islamabad. It will have an Advisory Council with the following consitution:

1. Minister of Industries - Chairman
2. Representative of Ministry of Finance.
3. Representative of Ministry of Science & Technology
4. Representative of Ministry of Communications (Railways, Posts & Telegraph)
5. Two representatives of Ministry of Commerce
6. Representative of Ministry of Production
7. Representative of Pakistan Atomic Energy Commission
8. Representative of Federation of Pakistan Chambers of Commerce and Industry.
9. Representative of Pakistan Mint
10. One representative each of the 4 Provincial Governments.

3. The Director General of the Authority is to act as Secretary of Council and it is envisaged that he will submit the recommendations of the Council for approval of Secretary, Ministry of Industries for implementation. The Authority will be headed by a Director General having under him Director, Central Testing Laboratory and Director, Pakistan Standard Institution.

4. The main functions of the Authority have been visualised as follows:

i) To check the production of sub-standard goods in the country in various phases as notified from time to time (the first phase will comprise items listed under Compulsory Certification Marks Ordinance 1961).

ii) To inspect and test all the purchases made by the Government, Semi-Government, Autonomous bodies or private organisations/bodies if desired by the private organisations/bodies.

iii) To check and inspect goods for import and export.

iv) To frame Pakistan Standard specifications.

v) To set up at various centres at important

industrial towns or authorise other such organisations having appropriate facilities to carry out the necessary inspection/testing.

vi) To take penal action against defaulters accord- to rules as framed and notified from time to time.

5. It is envisaged that the existing statutory body meant for grading and inspection of specified items will continue their notified functions but in case of dispute the Authority will act as an appellant body.

6. It is envisaged that after the Authority comes into being the Pakistan Standards Institution (Certifications marks) Ordinance 1961 will be superceded by notifications to be issued by the Authority.

PRESENT POSITION OF QUALITY CONTROL IN INDUSTRY IN PAKISTAN.

8.01 It may ofcourse be conceded straightaway that the proposal to encourage and enforce the organisation of quality control cells and by the same token testing and R & D laboratories in industrial units is a welcome step and long over due. Indeed in many developing countries like India where there is a vast paraphernalia of research and testing laboratories the industrial units have gone forward to establish sizeable research and testing facilities. In Pakistan the position is that except in some foreign investment units and some public sector units and a few others there is very little organised effort for maintainance of quality control in industrial units.

8.02 A recent survey by PCSIR in collaboration with US National Bureau of Standards which covered 30 Government and private industries in January 1979 disclosed that even in such units like Carrier Telephone Industries, ELMAC, Packages, Dawood Hercules there is inadequate local national effort. In may cases material and equipment and instruments are imported from abroad and constant recourse has to be made to parent organisations.

However, with a little change of approach these units are not only capable of establishing quality control in their production but to serve as focal points for other units in these categories. Another group like RGA, EMCO, PECO and MTF are quality conscious but have hitherto suffered from lack of qualified and trained scientific staff or obselencence of instruments and machinery. The third category of industries surveyed displayed lack of realisation of the needs of standards and quality control. All these efforts have suffered in the obsence of a proper calibration service in the country about which more will be said later.

8.03 A survey carried out by the Institute of Business Administration Karachi covered 16 units in the fields of pharmaceuticals, cosmetics, motors and transformers, radio and TV, steel making, collapsible pipes, glass vials, chemicals, and plastic and textile. The survey concluded that " the present state of quality control systems in vogue in the country is deplorable." No proper techniques of sampling are adopted. There is no proper method of determining AQL nor any use of ' special inspection level.' The process control charts are not being employed by a large majority of the firms surveyed. Even for control of raw materials there is no systematic randomization.

8.04 While it is correct to say that quality control has not yet become a normal feature of industrial production in the country, the picture is not entirely bleak and there is much to build upon. Multinational Corporations, Pakistan Subsidiaries of foreign enterprises and joint industrial ventures have generally been standard and quality control conscious. A number of Pakistani-owned enterprise have respectable out-fits for quality control. On a macro basis the larger

chemical industries in Pakistan have recognised the importance of quality control. Cement industry for example, fertilizers, paper, PVC and refining industries do exercise process control at various stages through their quality control laboratories and finished products are also subject to test. In petroleum processing field process control and instrumentation have been adopted in a satisfactory manner. Reputable POL marketing companies are also quality control conscious and terminals are usually provided with testing equipments. While complacency in public sector units in regard to quality control at all stages of production and processing would not be justified it has to be conceded that on the whole this aspect has received greater attention in these units than in industry in general. All these efforts must be recognised, encouraged and further expanded. This is the base on which total quality control in industrial production in Pakistan should be built up.

8.05 Notwithstanding the legal structure and the compulsion inherent in standards marking these efforts have failed to produce the desired impact. In the view of the Consultants the main reason for failure to achieve the desired results is not lack of adequate legal cover or for that matter even institutional arrangements but lack of over all plans, lack of coordination, weakness of the institutions in both administrative and technical aspects and the fact that quality control has not yet permeated amongst producers, manufacturers and consumers in Pakistan as a national philosophy.

FINDINGS AND BRIEF RECOMMENDATIONS.

9.01 1. As a result of this study it has been confirmed that CTL needs to be streamlined and upgraded by provision of infra-structure facilities, repair, renovation and replacement of equipment and provision of desired instruments for instrumental analysis, training programme, increase in personnel,

improvement of salary grades and other incentives.

2. Pakistan Standards Institution must immediately be strengthened to perform its vital role of certification mark licenses and in-plant inspection

3. PCSIR should be integrated in quality control programme and should play a direct role in standard formulation.

4. There is adequate legal cover even at present which could have produced beneficial results for quality assurance, if fully implemented. The proposed ordinances for quality control in industry and accreditation of inspection agencies are steps in the right direction. However, it is imperative that various legislative measures and arrangements should be integrated and properly coordinated.

5. Quality control arrangements in industry in Pakistan are inadequate. There is need for instroducing quality consciousness in all sectors of economy and society and at all levels in industry.

6. There are respectable facilities for testing, standardisation and quality control dispersed all over the country in the private sector and under various agencies of Federal and Provincial Governments. There is need for making full use of these facilities and linking them towards a common objective of quality control.

7. In order that available facilities are fully utilised, waste and duplication are avoided and that there is total effort for quality control it is necessary that inspection, standardisation, certification, testing training and propagation for the common objective of quality control are brought under a national authority.

9.02 It is in the context of the present profile of quality control in industry, statutory cover for preshipment inspection and certification marking and agricultural marking and grading and realisation that substantial additional efforts a required, the detailed survey,

examination and assessment of facilities and procedures in Central Testing Laboratories for testing, that it has been found that a massive effort is required for improvement and up grading in CTL which have been detailed in the later part of the report. Similarly the need for Pakistan Standards Institution to function effectively has been recognised and it has been concluded that its strength is wholly inadequate for performing the tasks which it should be doing to carry out its objectives in the context of quality control. After examining the statutory cover presently available for quality assurance [illegible] and the proposed legislative measures it has been found that while they are all right in their respective places the efforts will not produce the desired result unless properly integrated and coordinated. Accordingly the need to establish a National Authority for quality control has been identified and specific recommendations have been developed for its objective and the scope of its operations. Irrespective of the constitution of a National Authority it has been recommended that in the short run Central Testing Laboratories should primarily be deveoped for for purposes of assisting Government procurement operations, carrying out tests of products referred to it by Government agencies and industry and for conformance testing of samples referred to it under certification marking scheme. Pending the establishment of a National Standards Laboratory as a long term measure it has been recommended that PCSIR laboratories should be used for tests and R&D work related to standard formulation. It has also been recommended that an integrated programme for metrology should be developed and while primary standards are to be maintained by National Physical Standard Laboratory of PCSIR at Islamabad secondary and tertiary standards should also be the

function of PCSIR Laboratories. Finally, it has been concluded and accordingly recommended that to achieve total quality control, ensure proper coordination and to avoid conflict and duplication a National Quality Control Authority should be set up with functions related to inspection, testing, national standards, certification markings, pre-shipment inspection, enforcement of quality control in industries and developing quality mindedness as a national philosophy, and that the National Quality Control Authority should be set up under the presidentship of the President of Pakistan.

HISTORICAL BACK GROUND OF CENTRAL TESTING LABORATORIES.

10.01 When partition of the Sub-Continent took place and Pakistan emerged on the map of the world as an independent country it had a non-existant or a narrow industrial base. The institutionsfor testing, standardisation and quality control of manufactured articles or raw materials and for that matter of commodities and manufactures for exports such as they were available were largely in the Indian part of the Sub-Continent. The Railways had a testing laboratory at Moghalpura where there existed a large workshop essentially for repair but also for production of equipments and machinery for use by the Department. On the side of Defence an Assistant Inspector of General Stores was located at Lahore and a small POL laboratory existed in Karachi which were formerly subordinate offices of the main Directorate at Kanpur, India. The Department of Supplies & Development inherited by the Government of Pakistan had an Inspection Wing for purchases made by the Government including defence and railways.

On the recommendations of the first Pakistan Industries Conference held in 1949 and realising that a Laboratory capable of testing and analysing all sorts of finished products and raw materials according to standard specifications was required to promote healthy

growth of industries on scientific foundation the Central Testing Laboratories and Standard Karachi were established in 1951 as a counter-part of the Government Test House Alipur, Calcutta, India as a part of the Inspection Wing of the Department of Supplies & Development under the Ministry of Industries for the testing of samples received by the Supply Wing against Government orders. Subsequently a regional laboratory was established at Dacca in 1955 and another at Lahore in 1959. In 1956 it was decided to set up Pakistan Standards Institution as a separate institution and the laboratories were re-named as Central Testing Laboratories.

In line with the objectives, CTL's activities thus cover the following main spheres:

i) Testing;
ii) Training to others;
iii) Advisory services

Central Testing Laboratories had been imparting training in the past to students of graduate, post-graduate and Ph.D. level in various trades of testing from local and foreign Institutions, viz. Karachi University, NED Engineering University, Naval Dockyard, Pakistan Steel Mills, Saifi Institute, (Polytechnical Institute) Engineering students from Air Force, candidates from N.D.V.P. and foreign students from R.C.D., Indonesia, Saudi Arabia coming to Pakistan under various programmes.

Being a service organisation Central Testing Laboratories in addition to the testing on nominal rates has rendered its services free of cost to the other organisa-

tions in fulfilment of their objectives, e.g.,

a) It invariably attends all of the meetings of the PSI at all levels. It helped PSI in the finalisation of about 60 new standards and revision of 26 existing standards during the last year.

b) It attended about 10 meetings for the pre-shipment inspection scheme of Export Promotion Bureau, Karachi last year.

Central Testing Laboratories is basically a service organistion and as such its revenues are independent of the expenditure. The only source of its revenue is the fee which it charges for the testing of samples. However, for statistical purposes a statement showing the Budget Grant, Expenditure and Revenue Budget and Revenue Receipts for the previous years are reproduced below:-

Year	Budget Grant	Expenditure	Revenue Budget	Revenue Receipts
1977-78	1,988,400	1,491,565	425,000	490,612
1978-79	2,203,900	1,904,977	450,000	590,859
1979-80	1,975,000	1,537,021	450,000	643,899

FUNCTIONS OF CENTRAL TESTING LABORATORY.

11.01 Before an assessment can be made of CTL's working and its place fixed in the quality control programme it is essential to be clear about what CTL was planned to do, what it has actually been doing and what it is capable of doing in future. The list of functions as given to the Consultants gives 15 functions as given below. They are a slight variation of the functions as given in Project Document originally prepared in 1974-75 extracts from which are given at Annexure I.

1. Testing of industrial materials and products and establishment of quality, grade and composition with reference to relevant national, international or given specifications or standards.

* Figures provided by CTL, variation from Annexures XV - XVII may be ignored.

2. Assistance to Federal, Provincial Governments and Semi-Government organisations in the procurement of stores.
3. Assistance to Federal Government and Semi-Government Agencies in the evaluation of quality, grade and composition of material for development and modernisation of industry.
4. Assistance to Federal Government in the framing and implementation of standardisation and product certification policy.
5. Assistance to Federal Government in the establishment of quality, grade and composition in the realisation of excise and custom's duties.
6. Assistance to Federal Government and Semi-Government Organisations in the evaluation of quality, grade and composition of construction material for public building structures, goods etc.
7. Assistance to industries controlled by the Federal Government in the enforcement of quality control.
8. Assistance to Federal Government in the establishment of verification of quality, grade and composition of agrarian products.
9. Assistance to Federal Government in determining export rebates.
10. Assistance to Federal Government in law suits and disputes concerning policy, grade and composition of industrial materials and products.
11. Assistance to Federal Government in framing the policy of tariff concessions to indigenous industries.
12. Assistance to Provincial Governments in the establishment of verification of grades, composition of industrial products and materials for development and non-development activities.
13. Assistance to Commerce and Industry in public and private sectors in the establishment and verification of quality, grade and composition of industrial

material and products for the purpose of imports, exports and establishment of indigenous industry for domestic consumption etc.

14. Calibration of industrial measuring regulating instruments, and appliances to ensure production according to standard requirements.

15. Providing training facilities in testing procedures and techniques to local and foreign students and personnel.

12.01 Even a cursory analysis of the list will make it clear that the list is some what repetitive and inflated. It would be correct to say that the duties and functions of the Central Testing Laboratories may be listed as follows:

1. Testing of industrial and agricultural materials and products for quality, grade and composition with reference to relevant national, international or given specifications or standards. These materials and products are those which are procured by Federal/ Provincial Governments and agencies and autonomous corporations or those which are referred to CTL by those Agencies. This will also include materials and products referred to CTL by PSI for standards specifications and those referred to CTL in the process of licensing or surveillance testing under certification marks ordinance. Also samples which are referred to CTL for testing or resolution of disputes by private sectors.

2. The testing of materials and products for development and modernisation of industry.

3. Assistance to Government agencies in the context of tariff policies, export rebates and determination of excise and custom's duties.

In the past CTL have been involved in the introduction of metric system of weights and measures but

it is no longer charged with this responsibility. In the absence of any designated calibration agencies CTL has also been assisting some industrial units like Karachi Steel Mills, Metropolitan Steel Mills, Atlas Cables in calibrating regulating instruments and appliances within the limits of its resources and equipment facilities. At present CTL have one Amsler box of 300 tons capacity able to calibrate compression testing machines from 50 tons and upwards capacity. In the past CTL have provided training to foreign personnel but during the last 3 years no trainee from any foreign country has been received nor has any local training programmes been held. During the last three years CTL provided on the spot services for the testing of fuel used in VIP aircrafts on 12-18 occasions but with such facilities having been developed elsewhere the call on CTL's assistance has been infrequent. It has been mentioned above that one of the main functions of CTL as a national standard laboratory has been to test materials and products for development and modernisation of industries. However, with the general detrioration in morale, detrioration of equipment facilities and lack of training there has apparently been little achievement to show in this regard and the Consultants have not been able to get any statement of any significant contribution made towards this end. In the list of functions it has been mentioned that foreign missions have also been using the services of CTL but enquiry revealed that there has been no such occasion during the last 3 years. Basically, therefore, CTL's duties and functions have revolved round item 1 mentioned above. In fact CTL's role has mainly been that of a laboratory for testing materials for purchase organisations and for 'conformance testing', that is the on going testing of manufactured products in order to ensure that the product conforms to applicable standards/ contracts.

TECHNICAL FACILITIES IN C.T.L.

13.01 The Consultants have made a deep study of the facilities and equipments available in the Central Testing Laboratories at Karachi and Lahore. Actually this whole matter has been under investigation for the last few years and in their reports prepared for the Government of Pakistan by UNIDO experts namely Dr. Stanford, L.Smith, Mr. Raymond H.E. Nelson and Dr. Zurab Kherodinashgili they have examined the present profile of CTL in some aspects of present set of equipments and the additions required in great detail. The UNIDO expert Mr. El-Batoori has been seized of the problem since he was assigned to CTL and he has already submitted a number of interim reports with which the Consultants found themselves in complete agreement.

13.02 Today the position is that testing is facing greater and newer challenges to respond to the more and more complex requirements by consumers for quality and safety of product. New scientific techniques are coming up and indeed very sophisticated techniques are becoming common place in industrialised countries. Position annihilation has invaded Metallurgical laboratory. Pollutants are now being controlled by using excited electron orbitals in complex molecules. Lasers are available to manufactures and testers for process and product. Servi controls, automation and computers are being increasingly used in production process and testing. Indeed the range of instrumentation in the field of technology of production and testing is quite bewildering. However, two considerations must prevail. Firstly that the instrumental, physical or chemical basis for the testing methodologies mentioned above may be complex yet they could often be easily handled by properly calibrated 'black boxes' and 'universal testing machines.' The best should not be allowed to be the enemy of the good and the Consultants are conscious of constraint of funds and trained personnel.

CONSULTANTS' RECOMMENDATIONS ABOUT EQUIPMENT AND INSTRUMENTS.

13.03 Accordingly after reviewing the matter in great detail they have the following recommendations to make:

1) The equipments which are repairable should be taken up first and available funds and personnel should be utilised for setting them right. A list of such equipments is given in Annexure III.

2. A number of equipments are beyond repair or have outlived their utility or spare parts are not available. There is no use retaining them in the inventory. They should be scrapped. List is given as Annexure IV.

3. The Consultants have also noticed that a number of instruments have become out-worn or obsolete and would need to be replaced as part of a regular programme. Provision should be made for replacing appropriate items at least in the next year's budget and gradually the obsolescence should be done away with. List is given at Annexure V.

4. Fortunately CTL is now equipped with Jarrel Ash Atomic absorption Spectro photometer. For present purpose it would suffice if the following additional insruments could be added on priority basis:

a) Liquid chromatograph
b) Gas Liquid chromatograph
c) Infra red spectrophoto-meter
d) Ultra voilet visible spectro photo meter
e) Universal testing machine 200 ton (there is a UTM of 50 tons capacity but this is old and may have to be scrapped). Some idea of the progressive utilisation of spectrophotometer may be had from the following figures:

Month	No.of samples	Revenue (in Rs.)
April 1981	19	1990.00
May 1981	27	3790.00
June 1981	40	4920.00

13.04 This list is by no means exhaustive but considering that the whole matter of pro ision of required instruments to CTL has now been pending since 1973, that PCI proposals for this purpose have had to be repeatedly revised raising the cost from the original Rupees 2.8 million to Rupees 6.3 million now, that the staff is still untrained in sophisticated instruments, utilisation and procedures and that the instruments listed above should prove adequate for all present purposes (indeed for the next 5-10 years) of identification and quantification, the Consultants have resisted the temptation of suggesting an additional list. With these instruments CTL would be able to handle testing of Drugs, Water, I.O.L. Coal, Minerals, Oil, Pesticides, Toxic materials and many other products for which facilities do not exist or are inadequate or the procedures are too cumbersome at present.

REQUIREMENTS OF PHYSICAL WING OF CTL.

13.05 The Physical Wing is equally ill-equipped. In 1975 Dr. Zorab Kherodinashvili had concluded as follows: " In the Physical Department there is only out of date equipment for technical testing of metal, CTL have no facilities for non-destruction testing and metallography. However, there are several persons trained in radiography, ultrasenic X-ray and gamma-ray inspection". The position has not much changed since then and has only detriorated further as a number of equipment have gone out of order and need replacement. As it may not perhaps be feasible to equip all Wings of the laboratory at the same time, the revised PC-I proposed by the laboratory has laid stress on equipment vitally needed for instrumental analysis, mainly in the chemical field. The deficiencies in the Physical Wing will, however, have to be made good we enclose at Annexures & the list of equipment needed for modernisation and up grading of the Physical Wing for non-destructive, destructive and metallurgical testing and for calibration recommended by UNIDO experts in the past. However, it does not seem feasible to arrange

all the equipment in one go and we should lay stress on equipment needed in particular to provide testing facilities for industrial goods listed in PSI Certification Marks Ordinance. These equipments with their estimated price are listed below:

Central Testing Laboratories

K A R A C H I

List of Equipments required for the complete availability of testing facilities required for industrial goods listed in PSI Certification Marks Ordinance 1961.

Sl.No.	Description of equipment.		Qty.	Make	Price. (Approximate)
1.	Voltmeter	0-1V)Precision 0-5V)type for 0-10V)AC/DC Internal resistance 50,000 Ohm.	1	Weston Inst. N.Y., N.J U.S.A.	10,000
2.	Voltmeter AC/DC	0-20V) 0-50V) -- do--	1	--do--	10,000
3.	Voltmeter AC/DC	0-100V) 0-500V) --do--	1	--do--	1,000
4.	--do--	0-1000V) 0-5000V) --do--	1	--do--	1,000
5.	Milli-Voltmeter	0-10 mv) 0-50 mv) 0-100 mv) --do--	1	--do--	1,000
6.	Micro-Voltmeter	0-1 mic V) 0-1 OmicV) 0-100micV) -do--	1	--do--	1,000
7.	Ammeter	0-1 amp)Precision 0-5 amp)Standard 0-10 amp)with low resistance.	1	--do--	1,000
8.	--do--	0-20 amp) 0-50 amp) 0-100amp) -do--	1	--do--	1,000
9.	Milli-Ammeter	0 - 10 mA) 0 - 50 mA) 0-100 mA) 0-500 mA) -do--	1	--do--	1,000

S.No.	Description of equipment.			Qty.	Make	Price (Approximate)
10.	Micro Ammeter	0-10 mic A) 0-50 mic A) 0-100 micA) 0-500 micA)	Precision Standard with low resistance	1	--do--	1,000
11.	Watt meter Single Phase.	0-10 W) 0-20 W) 0-50 W)	Precision Standard.	1	--do--	1,500
12.	--do--	0-100 W) 0-200 W) 0-500 W	--do--	1	--do--	1,500
13.	--do--	0-1000W) 0-1500W) 0-2000W=	--do--	1	--do--	1,500
14.	--do--	0-5000 W	--do--	1	--do--	1,000
15.	Digital Multimeter. (Major)		--do--	1	A V O Ltd.	10,000
16.	Digital Multimeter (Minor).		--do--	1	--do--	5,000
17.	Precision resistance Box(Post Office box).	1-50 Ohms	-do-	3	Griffin and George	500
18.	--do--	1-100 Ohms	-do-	3	--do--	1,000
19.	Resistance Substitution Box with low & high ranges with fractional ranges	0-10 M Ohms.	-do-	2	--do--	1,000
20.	Kelvin Precision Bridge Bench type calibrated with jib & clamps for heavy and under ground and over head cabler to hold one meter length of cable, Bus bars, terminals etc.	0.000001 to 1 Ohm 0.000001 to 10.0hms. accuracy 0.01 %		1	Any Standard make.	25,000

S.No.	Description of equipment	Qty.	Make	Price (Approximate)
21.	Interference Microscope for measuring honing angle of safety razor blade.	1	-do-	1,50,000
22.	Standard test finger as per Appendix of P.S.185:1962	1	Any Standard make	500
23.	Vertical travelling telescope least count 0.001 cm accuracy .01% Electrically driven survo-mechanism for up and down movement.	1	--do--	10,000
24.	Turbiditiometer-Fineness test apparatus Wanger type.	1	--do--	10,000
25.	Rapid discharge test apparatus for 6 Volts & 12 Volts Lead Acid storage Batteries, Capacity 500 amps.	1	Japan Storage Batteries Co. Ltd.Kyoto.	1,00,000
26.	Vibration machine for 6 Volts & 12 Volts Lead Acid storage Batteries.	1	ICHISEIKI, Co.Ltd., Tokyo Japan.	5,00,000
27.	Anmometer for Air delivery test on A.C.Fans.	3	Any Standard make	15,000
28.	Standard mandrels of different sizes.	4	--do--	20,000
29.	Standard mandrels with taper shanks	4	--do--	30,000
30.	Optical Alignment apparatus	1	--do--	2,00,000
31.	Clamps & dial gauges.	4	--do--	10,000
32.	Vertical stands with pippet gauges	12	--do--	20,000

We would recommend that for installation of equipment for Physical Wing during next year a new PC-I should be prepared as it is essential that the laboratories should be well equipped for Chemical, Physical and, in due course, Biological testing.

LAHORE LABORATORIES.

13.06 The Consultants have visited the Laboratories at Lahore and have found that it lacks basic facilities.

The Chemical Testing Laboratory in particular has the following deficiencies:

1. No air conditioning - no temperature or humidity control
2. No dust control and little ventilation
3. Space for working benches is wholly inadequate
4. No Fume Cupboards
5. Water supply, power supply and Drainage defective.

The Consultants have had the benefit of exchanging views about the lay out and design of the Lahore Lab. with UNIDO expert. It is not yet necessary nor possible to duplicate the instruments proposed for CTL at Karachi. A list of the Equipments presently available in Lahore Laboratory is given at Annexure VIII. With the new layout and design, the provision of additional benches and other fixtures as proposed by UNIDO expert in Annexure IX with which the Consultants are in general agreement, the Lahore laboratories should be able to perform their task adequately in the short run. However, in view of the distances involved and new industrial activity in the North the upgrading and instrumentalisation of Lahore Laboratories cannot be postponed indefinitely. This matter may be taken up for consideration perhaps after a year of installation of the instruments in the Laboratories at Karachi when practical experience has been gained and the utility of the proposed instruments and the capacity of the staff to undertake training assessed. There is only one point where the Consultants have slight reservation in regard to the recommendation made by the expert and that is for the need for air-conditioning the

entire laboratory at Lahore. The air-conditioning of all Laboratory rooms may not be necessary and this may be done under a phased programme.

13.07 The Consultants are aware that the UNIDO expert/Team Leader Mr. El-Batoori was of the view that the laboratories both at Karachi and Lahore should have similar testingfacilities in terms of equipment and apparatus because of their exactly similar activities and the long distance between them and also that the laboratories at Lahore should be centrally air-conditioned, The Consultants would not wish to quarrel with this view in principle and it is merely a question of phasing and what is feasible at present. The Consultants find it difficult to ignore that in the 7 or 8 years that the UNIDO project has been under consideration and partly in operation only one instrument has been added at the Karachi laboratory and constraints of funds both aided by UNIDO and those provided by the Government of Pakistan and the need for upgrading the technical expertise of personnel make it desirable that priority should be accorded to the Central Testing Laboratories at Karachi. The central airconditioning of the Lahore laboratories would be a desirable step and is not questioned but in the first instance the desired upgrading can be achieved by room air conditioning of the main laboratory areas. It is also necessary to take note of the fact that CTL Karachi was established to play the role of a national testing laboratory to cater to the needs of the entire country in accordance with the recommendations of the First Industries Conference held in 1949 and as subsequently clarified by the Ministry of Industries in 1961. The regional laboratories at Dacca (it is not of concern to us now) and that at Lahore were established primarily to meet the regional requirements. The routine type of work of testing is ofcourse of a common nature

but sooner than later CTL Karachi should come into its own as a national laboratory and will in any case be charged with the task of playing an active role in the testing under certification marks scheme. It has been said that till such time as full scale, fully manned and equiped laboratories can be set up at Lahore and in due course at Peshawar and Quetta, CTL's role may be comparable to that of a central hospital of a country equipped both for routine as well as specialist services while being content to ensure that the regional laboratories are properly equipped for their routine work.

BUILDING AND ACCOMODATION OF CTL.

14.01 It has been said in various reports in the past about the inadequacy and unsuitability of accommodation at Karachi. In fact the consultants have no manner of doubt that the present location of the Laboratory is wholly unsuitable for a national laboratory.

The Consultants would not wish to burden this report with a detailed description of the buildings and lack of facilities in the laboratories at Karachi and Lahore. The repeated visits made by the Consultant's team members have served to confirm that the present position is such that it can but be called a disgrace to an organisation of the nature of a national laboratory. There are no temperature and humidity controls, dirt is every where, ventilators and window panes are dirty and broken, pigeons roost everywhere, glassware, files, records, spare parts, samples are kept and stored in the absence of storage facilities in a manner which would reflect adversely on the working of any office, much less a central laboratory.

14.02 It is true that being located in the centre of the town it provides some convenience to customers bringing their samples for testing but the right atmosphere is totally lacking and the requisite facilities cannot be built up in existing structure which was ill

planned for a modern laboratory. However, the building is quite suitable for office purposes and could obviate the need for construction of new premises for some office of the Federal Government under consideration. While conscious of constraints of funds and difficulties in obtaining sanction for an entirely new project the Consultants in all honesty are unable to support the proposal for a new building adjacent to the existing building. The Consultants would strongly urge that consideration be given to find suitable land in the vicinity of PCSIR Laboratories for construction of a new building comensurate with the requirements of a national testing laboratory. Meanwhile if the recommendations made later for creating an Authority of which CTL would be an integral part, is likely to be delayed, adequate powers should be given to CTL after necessary monitoring by the Ministry of Industries, if necessary, to undertake directly such essential and minor renovation and repairs which are presently required or which may be required later.

URGENT IMPROVEMENTS REQUIRED IN CTL KARACHI

14.03 First things must come first and the Consultants have no manner of doubt that Government can demonstrate their conviction to build up quality assurance as a national philosophy by immediately ensuring that the Central Testing Laboratories present a picture of competence and reliance based on minimum infra-structure and physical facilities pending the construction of a proper national standards laboratory as recommended by the Consultants. Pending the construction of a new building at suitable premises the following steps should be taken on priority basis:

1. The entire building should be repaired and painted and generally renovated inside and outside,
2. The buildings, specially the Laboratories rooms

should be air conditioned and controlled for humidity and dust. Special lighting arrangements be installed in Testingand Sampling Rooms. Doors and windows should be properly sealed.

3. A Fume Cupboard should be provided in every analysis laboratory. At the time of writing this report there was only one fume cupboard.
4. A separate power sub-station should be provided. Voltage regulators for the entire building or at least for all sizable and delicate instruments should be provided.
5. Adequate storage facilities for glassware, files, records and spare parts should be provided.
6. Deficiencies in Laboratory apparatus and services should be made good such as ovens, muffle furnaces, hot plates, analysers, constant temperature bath, evaporators, filter pumps, equipment racks, stands.

TESTING FEES.

15.01 Consultants have examined the schedule of testing fees presently being charged by CTL. These schedules are historical and generally prepared on the basic consideration of the enormity and complexity of the task involved in regard to various products and types. They were doubled in 1977-78 but with inflationary conditions there would seem to be ample justification for an upward rise. At the same time there are certain items where certain users like PSI found the charges somewhat exhorbitant and they have been able to get the testing done in other laboratories at lower cost. However, with the large investment proposed in instrumentation and the new methodology and techniques that are now proposed for adoption it would be pre-mature to consider any revision till investments have been made and greater experience gained of the time and effort involved in training of staff and operation of new technology.

The Consultants do not propose therefore to suggest at this stage an alternative schedule, which should be taken up at a later time. Meanwhile there should be a provision for flexibility and to avoid audit objection where, through negotiations, the need of a particular operation calls for a higher or lower revision of the rate laid down in the schedule, it should be permissible to do so, through clearance by a committee of three senior officials in the Laboratory.

SHARE OF TESTING FEES AS INCENTIVE.

16.01 The personnel of Central Testing Laboratories are entitled to a part of the testing fees received from clients using the services of the laboratory. Instead of undergoing upward revision in the context of inflation and to encourage the personnel they have in factbeen revised down wards f[illegible] 40% to 30%. After standards have been laid down in the laboratory for timely and proper inspection and the Director is satisfied that the test has been competently carried out and there has been no avoidable delay, the laboratory personnel are clearly entitled to adequate reward. It has been suggested to us that the major portion of the testing fees should be given to them as reward. This we find difficult to endorse if only because of the large investments that have to be made in providing facilities for the purpose. Sharing on 50 : 50 basis would seem to be adequate. However, we would like to under line the fact that this should be an incentive for satisfactory work and not a routine and by the same token the procedures should ensure that payment is made promptly and is not subjected to unnecessary administrative control.

IMPREST AND PURCHASE PROCEDURES IN CTL.

17.01 A sum of Rs. 1000/- was sanctioned as the permanent advance to CTL by DGS&D in 1952. This is clearly inadequate and CTL have been obliged quite

often to use the money received as testing charges for purchase of urgently needed stores and chemicals which have been subject matter of audit objections. In 1976 CTL had approached AGPR for increase in the permanent advance. Actually the problem will take care of itself when the Authority proposed by us is set up which will function as an autonmous organisation, but pending the creation of the Authority and transfer of CTL to the Authority urgent steps should be taken to remove this irksome difficulty by increasing the permanent advance at least to Rs. 10,000/-.

PROCEDURES FOR PROCUREMENT OF STORES IN CTL.

17.02 While on this subject the Consults feel that immediate attention needs to be paid to the procedure for procurement of stores and materials for use in the Laboratories. It may take sometime for the Government to accept and implement the structural reorganisation proposed later in the report and therefore the present difficulty arising from the fact that the laboratories have to make all their purchases except for some minor items through the Department of IP&S must be removed. This system is clearly unsuitable for an organisation like the laboratory and it is not surprising that they have suffered on various accounts like price factor, quality, delay in installation and lapse of funds. The problem had been identified earlier in the report of the President's Special Representative on Administrative Reform for 1973 and it is disappointing to note that no appropriate measures have been taken so far. The Laboratory administration should be given the authority to make direct purchases subject to Budgetary Control and observance of procurement procedures.

LIBRARY

18.01 No account of the present profile of CTL will be complete without reference to the state of CTL's Library. To keep the staff abreast of latest developments and techniques in the field of analysis an upto-date reference Library is a basic requirement. But

unfortunately the CTL's Library consists of about 100 books, 6000 standard specifications and 2500 periodicals most of which are out of d . All the journals are old and out of date.

18.02 Due to lack of adequate funds the CTL cannot subscribe to any local or foreign technical journal on a regular basis. In the year 1979-80 a sum of Rs. 3000/- was placed in the Budget at the disposal of CTL which it paid as subscription for the purchase of "Analyst" - a technical journal and newspaper so that it could not purchase any book during the said year.

18.03 For any scientific and technical institution to function in the absence of an adequate Library is unthinkable. The up grading of CTL will fail to achieve the desired results if not accompanied with provision of an adequate Library. However, in view of the present situation it may have to be done under a phased programme and assistance should be sought from international sources for this purpose. Funds should be provided for subscriptions to relevant journals and periodicals for example, Analytical chemistry, Chromatographic journal of food technology, Journal of American Oil Chemist, Spectroscopy News Letter, the Analyst etc. Essential books like Encyclopadia of Chemical Technology (16 volumes) and Thorpe's Dictionary of Applied Chemistry should be ordered immediately. In addition the Library apart from having a trained librarian and assistant has to be properly re-organised with suitable furniture and lighting arrangements. There is no documentation system at the moment and a library index system and micro filming facilities will have to be developed. The library should also be the depository of instruction manuals, drawings, lay-outs and spare parts lists for equipment

in use and proposed to be installed.

TRANSPORT REQUIREMENTS OF CTL.

19.01 There is no staff car or any other vehicle in CTL Karachi/Lahore. Presently the Laboratories have to engage private transport to make its daily purchases from the market, fetch equipment/apparatus from the PIA Cargo office or the Airport, move to the airport and oil refineries to provide on the spot testing of fuel to be used for VIP/President's air-craft. This involves a lot of expenditure.

19.02 The Consultants have recommended that calibration services should be the function of PCSIR laboratories pending the setting up of an independent standards laboratory. However, such functions in regard to calibration as are presently being performed by CTL need not be discontinued till adequate alternative arrangement have been set in motion. These responsibilities in particular require considerable mobility on the part of the personnel engaged in this task. A pick up and a van would meet the needs of the laboratory for the present.

SAMPLING PROCEDURES AND TESTING METHODOLOGIES IN CTL.

20.01 The Consultants have examined the methodologies currently adopted, sampling and testing procedures in vogue. The Sample Flow Chart in annexure X depicts diagram-matically the process for Testing on recept of a sample. This is an area which would need special attention if the other recommendations made for bringing into use essential instruments, augmentation of the staff strength, reorganisation of administrative structure, provision of physical facilities and other recommended measures have to produce the desired results. Fortunately the problems are well identified not only as a result of the three studies made by UNIDO assigned experts in the past, but by the current efforts set in motion under the able guidance of UNIDO expert Mr.S.el-Batoori. The Consultants have had several discussions with the expert and the Project counter-part and are happy to observe that the identification of the problem has been done

realistically and the measures proposed are on the right lines. The Consultants would recommend that the Testing Forms in which results are recorded and checked should be redesigned to provide guide lines, ensure adherence to techniques and keep a record of work done and checked. In Annexures XXa and XXb two such forms are given for internal and external use one for Finishing Paints and the other for Ropes, Threads, Yarns as an example.

20.02 At present more than half of the samples received for examination call for chemical testing which are subjected to as many as 15 determinations per sample. For physical and engineering testing, normally fewer tests are undertaken. For chemical testing, which involves more than two thirds of the work load laborious and time consuming wet chemical methods are adopted. The position will change with the utilisation of the atomic absorption spectro-photometer once the necessary arrangements for its proper utilisation as production of deionized water are provided. As it is, a number of instruments which could have been used are out of use for lack of spare parts, complete absence of maintenance personnel and facilities and unfamiliarity or lack of experience of the personnel with these instruments. Even the wet chemical methods currently in use for analysis and testing of metals, ores, alloys, POL, Petro-chemicals, oils and fats, foodstuffs, water, salts, fertilizers, paints and varnishes and basic chemicals cannot be said to be reliable as they are subject to multi-dimensional errors in the absence of scientific sampling, haphazard arrangements for handling samples and indeed lack of any standard code of laboratory practice. The deficiency in laboratory apparatus and services have made it impossible for competent and

reliable analysis and testing to be undertaken.

21.01 A special word is needed about sampling procedures. The laboratories have hitherto adopted the line of least resistance in receiving samples from customers who have not been trained and guided in scientific random sampling procedures. There is no guarantee of the representative character of the samples received and there is an urgent need for the laboratory to develop a document of their own for guidance and advice of the customers who choose or are obliged to use the facilities of CTL, so that a uniform scientific sampling procedure is adopted by the users to enable them to provide samples in the right type of containers with proper marking and in adequate quantities. On recept of the samples the whole thing is handled in an unscientific manner. The clerk receiving the samples is hardly qualified to determine where it has to go and whether it is in a fit condition for analysis and testing. During analysis the samples are kept in the laboratory without care to protect them from atmospheric effect or contamination. Between July 1979 and June 1980 as many as 2802 samples were received and there is an urgent need for introductionof a proper system of sampling. Here again the Concultants would like to compliment the UNIDO expert for the initiative in proposing proper samping technique and requirements.

21.02 As mentioned before clear guidelines have to be laid for guidance of the customers for producing a representative sample. There are some basic methods of sampling but consideration has to be given to the differences required for samples of different solids, liquids and gases. The Consultants would indeed suggest that it should be open to the laboratory not to accept a sample which does not correspond to established methods of drawing of samples, labelling and containment. It

should be in order in case of doubt for the laboratory examiner, who in his own turn should be properly trained in scientific sampling, to visit the stocks from which the sample has been drawn, to ensure that proper technique has been used and that it is a representative sample. The users and the laboratory should be on the same wave-length with regard to sampling procedures, sampling unit, composite samples, and analysis sample. After ensuring proper sampling technique and the representative character, the duties of these laboratories begin. The sample must be received and registered and handled by a qualified person who should at least be of the status of a Senior Examiner. Thereafter, while handling it in the laboratory, care has to be taken in regard to cleanliness, preserving sample composition, ensuring identification of samples, careful handling and transportation to the laboratory units concerned and protection thereafter against contamination, leakage, exposure to light or heat and entry of dust and moisture. On receipt by the Senior Examiner Incharge of the sample room the register should give the date and time of sampling, the date of receipt, name of the sampler, outward condition of the sample, name, code number of the owner, the code of the main laboratory section to which it is being referred including batch number, where possible, retention of proto-type of the sample for reference and security purposes bearing all the numbers mentioned earlier and the name of the examiner of the laboratory section receiv- the sample. We feel that unnecessary delays can be avoided if a competent Senior Examiner Incharge of the sample room can be charged with the responsibility of despatch of the sample direct to the laboratory section or wing concerned except in special or complicated cases. The present Flow-Chart mentioned in para 20.01 has delay and red-tape built into the system.

Either the receipt register containing the particulars specified above should be prepared in duplicate or the register itself should be submitted to the Deputy Director concerned at the end of each day to enable him to keep track of the operations and give directions or to seek the advice of the Director where necessary.

22.01 At present there is no sample store room and no arrangements for retaining the samples and storing them for a fixed period before disposal or destruction. This involves the provision of a proper sample room equipped with minimum essential apparatus and tools and storage facilities.

23.01 The Consultants have studied the sampling techniques proposed by the expert for sampling and analysis of gases, liquids, and solids including metal products. They are generally well known to the personnel of the laboratory but in the absence of a proper manual which enjoins on all concerned the adoption of the techniques and their respective responsibilities, there is no guarantee that they are actually followed. This manual and code is therefore essentially required to be drawn up and the effort already made by the UNIDO expert in laying down rules as on the subject should be accepted for adoption, while elaborating them in the context of the layout and arrangements as obtaining in the laboratory from time to time.

24.01 It is here that the Director has to play an essential role. The operation policies, manual and codes of practice have a way of falling into deseutude and becoming a dead letter. It is necessary, therefore, to lay down specific performance criteria and for the Director to constantly ensure that the criteria are being followed.

TRAINING

PROGRAMME AND FACILITIES FOR CTL.

25.01 There should be no difficulty in obtaining fellowships to provide training to the staff of CTL and (PSI). It is absurd to find that the present acting Director is the only one who was provided the opportunity for foreign training nearly two decades ago when the Chairman of the present Consultants was serving as Joint Secretary, Ministry of Industries. This deficiency ought to be made up quickly in accordance with a phased programme for both senior and junior levels, with two senior persons being provided Fellowship type overseas training on a priority basis. Apart from management training for Director, a Deputy Director and a selected Assistant Director and technical training for Senior Examiner level personnel in Metallography and Electrical Testing for, say, three months each, one person from the Karachi laboratory should be sent out urgently to spend, say three months or more with equipment and instruments manufacturing plants, not only those which are currently installed and on order but also those which are the normal features of laboratories in both developed and developing countries and for training in operation and maintenance of analytical instruments.

25.02 There is great need for elementary and advanced training courses for instrument technicians and repairmen. This training should include training in workshop skill. We cannot too strongly stress the need for training in these basic skills, because without the people to repair, calibrate and use advanced analytical and testing facilities there can be no adequate control. With the instrumentalisation that is being inducted into CTL, it is essential to realise that it demands good management skill as well as good technical skill. The working of CTL can be improved manifold if selected senior staff were given liberal management training in suitable foreign laboratories. This is in addition to training

in improving the technical skill of the people involved in laboratory work.

25.03 While laboratory management training and technical training for particular instruments and technique is vital, it would be beneficial also if visits are arranged to countries with similar environments but where modern management laboratories practices and instrumental analysis is in vogue. The Chairman of the Consultants recently visited India and was able to observe at first hand the functioning of some of the laboratories there. There is absolutely no reason why our laboratories cannot be brought up to the same level of operations. There is reason to believe that the Indian authorities as also those of other countries in Asia such as Singapore and Korea and Thailand would be happy to welcome a study visit for this purpose, which should also be availed of for studying the overall Quality Control programmes in those countries.

25.04 In addition to the training and training programmes and study tours additional effort is needed to upgrade the knowledge of laboratory personnel in laboratory management, Courses, organised by institutions of management and private consultants are sometime of considerable benefit to the participants and full use should be made of such opportunities. In addition short duration seminars should be organised and assistance should be sought from UNIDO and other agencies for inviting experts in specified fields.

25.05 There is a demonstrable lack of management philosophy in the laboratory essentially because the need has never been brought home to them. It is to be reflected in day to day activities and pride of performance through a built-in system. Periodical meetings to take stock of the situation would seem such an obvious thing that it would appear to be unnecessary to point this

out but no such arrangement seems to be existing. It would at least ensure better coordination and better realisation of the state (or lack) of progress.

NEED FOR MANAGEMENT CONSULTANT.

25.06 In this connection the Consultants would strongly urge that a local management consulting firm may be used for a management development programme for one year in addition to adoption of the specific recommendations made above for training programme and management development.

NEED FOR SPECIAL ASSIGNMENT FOR IMPLEMENTATION OF PROPOSED SHORT-TERM MEASURES.

25.07 Charged with the task of assessing and examining the present profile of CTL and its operation the Consultants have been greatly encouraged by the fact that the UNIDO expert/CTA, who is primarily concerned with chemical testing and instrumental methods of chemical analysis, has used his time in assessing the administrative and technical working of the CTL as a whole and in attempting to suggest and introduce measures for re-organisation and technical upgrading across the board. Many of the recommendations made by the expert and endorsed by the Consultants and such others related to CTL and PSI made by the Consultants would appear to be so obvious as not to have called for a special study. The fact of the matter is that the Consultant's Chairman who was closely associated with the working of CTL and PSI for many years, when he was Joint Secretary and Secretary in the Federal Ministry of Industries, had no idea of the deterioration in physical facilities, the frustration in the personnel and the deplorable state of equipment and instruments. It would be naive however to assume that the provision of the instruments or such training and advice and guidance, such as the expert had been able to give in the short time he had been attached to CTL, will be adequate to ensure that the desired uplifting, upgrading, improvement, reform and

progress will come about by the acceptance by the Government of the simple recommendations made in this report. All these efforts and this study would have been in vain if not followed up with a period of implementation with the assistance of some management consultants.

GRADES AND RELEVANT QUALIFICATIONS OF CTL PERSONNEL

26.01 The frustration and despondency in the staff at Karachi and Lahore have to be seen and experienced to be believed. This arises not only from the low grades when compared to what technical personnel of comparative qualification, experience and expertise get elsewhere, but also from lack of promotion or opportunities of promotion due to restricted staffing and other factors. This was considered by the Special Committee which had been set up as ong ago as 1973 under the Chairmanship of the Chairman PCSIR. During this period many administrative reforms have been introduced and the grade and structure for professional and technical personnel have undergone demonstrable improvement in various other services and organisations, yet the whole matter will have to be thoroughly reviewed when a central authority is set up in order that professional, scientific and technical personnel of comparable academic qualifications and experience are equitably treated on a uniform basis and where there would be ample opportunities for lateral and vertical employment - which is not the function of the Consultants to propose at present.

26.02 The Technical Committee with Chairman PCSIR as head and Deputy Secretary Ministry of Industries as Secretary and DFA Ministry of Industries as Member had made the recommendations given at Annexure XI . We

endorse the recommendations of the Committee to upgrade the status and lay down minimum educational qualifications and experience for determination of grades.

The Consultants are convinced that if the recommendations in the Annexure XI are immediately implemented they would go a long way to removing the current frustration and in providing the desired incentive to Laboratory personnel which will be reflected in improved performance.

26.03 It is necessary to point out that the sum total of these recommendations is that the posts of chemical/gauger/foreman which are presently in grade 13 have been recommended for upgrading to grade 16, that of senior examiner from grade 16 to grade 17, that of Assistant Director from grade 17 to grade 18, that of Deputy Director from grade 18 to grade 19 and that of Director from grade 19 to grade 20. In addition with regards to qualifications, graduates and master's in engineering have particularly been considered eligible and the serious deficiency of personnel with engineering qualifications can thus be made good in filling up vacancies and in making future recruitment.

26.04 The UNIDO expert had mentioned that the staff should be re-structured according to the following categories:

1. Professional scientific staff
2. Professional technical staff
3. Technical Assistants
4. Technicians
5. Administrative and clerical assistant.

With respect it may be observed that this classification is not understood but there is no basic difficulty if by scientific staff is meant graduates and masters in pure science disciplines, by technical staff is meant

graduates and masters in engineering and special disciplines and by technical assistants and technicians is meant technically qualified personnel for instruments and equipments maintainence or those who are presently designated as gaugers, foremen etc.

PRESENT ORGANISATIONAL STRUCTURE OF TESTING LABORATORIES.

27.01 Presently the laboratories are broadly organised into two parts, namely technical and non-technical. The non-technical side comprise 4 sections viz administration, accounts, stores and library. Actually there does not seem to be any clear division of wings as such because in various documents furnished by CTL from time to time or during discussions different patterns of organisations have been indicated. For example,at one place it was mentioned that the laboratories comprise 3 wings namely:

1. Physical and engineering wing,
2. Chemical wing,
3. Planning and development wing and an administration division consisting of 3 sections:

1. Budget and Accounts section,
2. Sample section,
3. Establishment section

At another place it is mentioned that the technical side is divided into 3 wings viz, chemical, physical and engineering which are in turn divided into several sections. For some time textile section has been working as a wing by itself and the functioning is largely sub-divided into physical, chemical and textile divisions or wings. From time to time depending on the load of work and availability of personnel the wings have been divided into the following sections:

1. Physical and engineering wing

i) Electrical division consisting of 6 technical sections

ii) Mechanical division consisting of 5 technical sections

iii) Building materials division consisting of 3 technical sections

iv) Applied physics division consisting of 3 technical sections

v) Textile division consisting of 6 technical sections

2. Chemical Wing

i) Inorganic division consisting of 10 technical sections

ii) Organic division consisting of 12 technical sections

3. Planning and Development wing

i) Planning division

ii) Development division

iii) Procurement and stores division

iv) Maintenance division.

ORGANISATION OF CTL ON BASIS OF DISCIPLINES OR COMMODITIES.

27.02 In connection with the setting up of any national laboratory a basic issue arises whether it should be organised on the basis of basic sciences - in-organic chemistry, organic chemistry, physics, biology etc. - or on the lines of testing facilities for main commodities or stores - chemicalsand paints, leather and footwear, drugs and pharmaceuticals, POL, Textiles and garments, metal, timber, building materials, farm products, food and food products etc. A theoretical answer is easy if it is possible to make a clear assumption as to whether the national laboratory is designed essentially as a laboratory for procurement assistance and conformance testing or whether it would be a playing a central role in research and development

also. The major consideration is not only the availability of testing facilities but availability and expertise of technical personnel and constraints of funds. Product - oriented (commodity type) organisation has the clear advantage of specialising which is conducive to research and development but it has the disadvantages of duplication of facilities which is minimised and simplified in staffing and equipment in organising the laboratory along discipline lines. The answer then is to have a mix which in fact is what has more or less obtained in practice.

27.03 The Dir has proposed the future organisation of CTL for Karachi and Lahore as given in Annexure XII and XIII a,b,c mixed pattern has been recommended. The technical wings are still proposed to be divided into two wings namely chemical wing and physical and engineering wing. The former is proposed to be divided into inorganic section, organic section, bacteriological section, food and farm section and surprisingly instrument and analysis section has also been placed under this wing. The physical and engineering wing is proposed to be divided into mechanical section, electronic section, electrical section, building material section, textile section and workshop and maintenance section. Without anticipating what we will have later to say in the report about the reorganisation of CTL it may be added that one of the major deficiencies is the lack of facilities for biological testing. The Consultants would urge that without disturbing basically the present structure of reorganisation till the main recommendations about the place of CTL in the total quality control programme is clearly delineated the laboratories at Karachi in any case should continue to be organised into chemical wing, physical wing and but more

emphasis is required on development of facilities for biological and bacteriological testing in the chemical wing. The pace and nature of industrialisation work on electrical and electronic side is bound to increase and it may soon become necessary to organise electrical and electronic work into a separate wing.

NATIONAL TEST HOUSES IN INDIA.

27.04 It would be pertinent here to examine the organisation of national test houses in India as the Karachi laboratories were originally organised on the pattern of Alipore Test Laboratory. Alipore Test House was established in the year 1912 and the National Test House accordingly has its headquarters there. A regional test house was opened in Bombay in 1963 and another in Madras in 1975 and a nuclus house for the northern regions in India has started functioning at Ghaziabad since 1977.

The scope and functions of national test house may be broadly summarised as follows:

1. Testing and evaluation
2. Research and development on industrial problems relating to testing and evaluation
3. Development work viz development of testing method, import substitution work by comparative evaluation of characteristics
4. Technical consultancy services to industries in the fields of materials, products and process
5. Field testing at sites by mobile testing units
6. Training of technical personnel.

The technical work is broadly grouped into 3 wings at the national test house, Calcutta.

A) Physico - Mechanical wing, divided into the following divisions:

a) Mechanical engineering division - mechanical engineering and metrology, hydraulics and internal combustion engine

b) Physical division - civil engineering, rubber, plastics, textiles, leather, paper

c) Nondestructive testing - static and mobile N.D. testing, metallography

B) Chemical wing

a) Chemical General division - including analytical chemistry and instrumental analysis and industrial effluent analysis

b) Paints and allied material division

c) Oils, petroleum products and high polymer division

C) Electrical and Electronics

a) Electrical division - general electrical engineering high voltage techniques, battery, switch gear, power supply systems, appliance using heat transfer techniques, photometry

b) Electronics division - electronics engineering, and illuminition engineering

While NTH Calcutta is organised broadly into 3 wings as mentioned above specialisation is achieved through specialised group of laboratories such as those under the civil engineering group e.g.

a) Cement testing laboratory

b) Concrete testing laboratory

c) Building materials testing laboratory

d) Timber testing laboratory

e) Soil and Foundry Sand testing laboratory

f) Sanitary fitting and appliances testing laboratory

f) Refractory and heat insulating testing mills laboratory.

Similarly the mechanical engineering division

has specialised group of laboratories as follows:

a) Heavy mechanical laboratory
b) Light mechanical laboratory
c) Hydraulic internal combustion engine laboratory

Somewhat differently from the position in Pakistan the chemical general division of the chemical wing has specialised laboratories in :

1. Metals and minerals
2. Building materials and inorganic chemicals
3. Pesticides, gases, bacteriological and physico - chemical

The electrical division has the following group of laboratories:

1. Battery test
2. Accessories, switch gear, cable and vantilating fans
3. Power, appliances, heat transfer and welding plant
4. High voltage
5. Photometry lamps and accessories.

The electronic division has the following specialised laboratories:

1. Electronic fittings and equipment
2. Reserves standards and measurement
3. Environmental testing laboratory

Other Divisions have also specialised laboratories.

27.05 It is important to note at this stage that in India the national test houses though organised on such a vast scale and over such a long period of time are basically concerned with testing and evaluation work. They do not have any primary responsibilities with regard to calibration and testing in the context of certification marking which is done by the Indian Standards Institution through their own laboratory. We will discuss this question

further when examining the functioning of Pakistan Standards Institution but at this stage before examining the staff requirements of CTI we may mention that in the absence of any laboratories under Pakistan Standards Institution the work relating to product and process testing and and surveillance testing under licensing and certification mark, which has been sadly neglected so far, will naturally devolve on CTL. A word, however, at this stage about metrology and calibration will not be out of place because they find a prominent place in the Project and both CTL authorities and the UNIDO experts have indicated that they envisage considerable addition to their work in regard to calibration.

METROLOGY AND CALIBRATION.

28.01 It may be noted that all the advanced countries and most of the developing countries have established National Laboratories to meet their needs of standardizing physical and chemical measurement and for carrying out fundamental research in these areas. The main job of such laboratories is to realize and maintain the primary standards of physical measurement, to develop and improve techniques of calibration, and to produce standard reference materials to which the physical, chemical and physico-chemical properties of materials could be traced. This hierarchy of measurement capability together with effective dissemination is fundamentally important for the advancement of science, technology and industrial quality control. With these aims in view, the idea of establishing the National Physical and Standards Laboratory (NPSL) in Pakistan was conceived.

KOREA NATIONAL STANDARDS RESEACH INSTITUTE

28.02 In Korea it was found that National Standards Research Institute (NSRI) corresponding to our PSI which was charged with the responsibility for national metrology standards was unable to carry out the responsibility effectively. It was felt that there was need for inde-

pendent central organisation to co-ordinate metrology standards activities, to supply technical guidance and instructionm on measurement, to ensure that these activities are efficient and effective and to link the Korea Me rological system to the international one. Accordingly a new Institute, the Korea Standard Research Institute KSRI was established. The two institutes are said to collaborate with each other in support of international programmes for standards and measurement practices. KSRI is linked to the World Master Station at the International Bureau of Weights and Measures in Severs, France.

28.03 With the establishment of National Physical and Standards Laboratory at Islamabad new dimensions have been added to Calibration and Metrology. The Consultants have visited NPSL. The Role and Functions of National Physical Standards Laboratory have a direct bearing on Calibration and Metrology. The NPSL primarily consists of the following two Divisions::

1. Standards and Measurement Division - The main function of this division is realisation and maintenance of primary physical standards and and development and production of secondary standards.
2. Materials Division- This division is responsible to procure, produce and maintain standard reference materials and to provide advisory services on testing of materials including physico- chemical techniques and instrumental analysis.

A nucleus of the NPSL was started in January, 1974. During the period 1974-77 apart from setting up the laboratory with the essential equipment, the main activity at the NPSL has been calibration of length, mass,

and volume up to the working standard level and helping the Ministry of Industries in implementing the International System of Weights and Measures in the country.

Besides experimental work on physical parameters and calibration of working and secondary standards of weights and measures, efforts have been directed to equip the NPSL at reference standard level.

FUNCTIONS RELATING TO WEIGHTS AND MEASURES.

In this connection it may be noted that on the recommendation of the Standing organisation committee, the President has been pleased to abolish the Department of Weights and Measures on 30.6.1980.

The various functions of the Department of Weights and Measures laid down in the Weights and Measures (International system) Act 1967, as amended from time to time, will now be performed by the following organisations as noted against each:

PAKISTAN STANDARDS INSTITUTION

a. Coordination with International Bureau of Weights and Measures (BIPM) and International Organisation of Legal Metrology (OIML)
b. Establishment of Standards.
c. Advice on adoption of new units to switching over Organisations.
d. Training of field staff of Provincial Governments and other switching over organisations.
e. Coordination with Provincial Government regarding implementations.
f. Publicity.

NATIONAL PHYSICAL AND STANDARDS LABORATORY OF PCSIR, ISLAMABAD

a. Maintenance of the Reference and Secondary Standards.
b. Annual verification/Inspection of working Standards of the Inspectors of Provincial Governments.

PRIMARY STANDARDS

28.04 The present position is that so far as primary standards are concerned they are as mentioned above now the functions of National Physical Standards Laboratory. In any integrated scheme of metrology and calibration on a national basis NSPL have to be the focal point to harmonise with interrational basic standards maintained by the Bureau in Paris. The present day System International (SI) is the function of NSPL. Facilities for certain basic measurements are available in some other organisations in Pakistan also, for example, for length measurement at the Pakistan Ordnance Factory, Heavy Mechanical Complex, Pakistan Industrial and Technical Assistance Centre, Pakistan Quality Control Laboratory, but there also for periodical calibration of the gauges, tools and instruments higher than one micro-metre facilities have to be provided by NPSL of PCSIR. NPSL itself has yet to develop full facilities for other measurements such as those for time, temperature etc. Some work on temperature control is done by PAF Laboratory and by companies like M/s Honeywell at Karachi but for actual realisation of standard temperature as per definition NPSL yet have to come in. NPSL hopes to establish within two years a section to ensure the availability of atomic time and frequency.

29.01 We have mentioned above that the metric cell having been abolished and the functions of Department of Weights and Measures having been dispersed with primary responsibility for implementation being with the Provincial Government, there is no clear assignment of responsibilities to any institution in the whole field of secondary calibration for commercial and industrial functions. CTL has attempted to fill the vaccum by providing calibration facilities of limited nature to

industrial units in Karachi through measurement of weights and measures for pressure, tensile strength etc. It has been assumed that calibration would be the function of CTL which has been considering the establishment of calibration centres at various locations in the country. The UNIDO Consultant Mr. Reymond H.Nelson had examined this matter in the context of equipment needs of CTL for physical testing and had given a list as at Annexure VII.

29.02 As a minimum requirement some of the equipments is in any case needed for the physical wing of CTL as we have indicated in para 13.05. The Consultants would refrain from endorsing the recommendation for provision of all the equipments in the list and some more needed for a Calibration Standards Laboratory till some further thought is given to the structural organisation needed for the purpose. The process of measurement in the context of calibration involves a series of steps or echelons by which the units of measurement established by NSPL will have to be handed down ultimately to the factory level. There is no denying that the transfer of unit of measurement from the National Laboratory to industries, standard laboratories would have to be set up in some Government institutions such as PCSIR Laboratories or Central Testing Laboratories. Such a Laboratory has to be equipped with standards of response, capacitance, inductance, voltage, temperature pressure, frequency attention. It cannot also be gainsaid that no system of OQA (Overall Quality Assurance) can be enforced without a national calibration service.

UTILISATION OF PCSIR FOR CALIBRATION SERVICES.

30.01 The Consultants have discussed this matter with Mr.S.el-Batoori but are unable to fully agree with him that in the short run CTL will be in position to serve as a Standards Laboratory for calibration

purposes. They apprehend that at the present stage of reorganisation and proposed upgrading of CTL the burden on CTL may be overwhelming. On the other hand the facilities available at PCSIR Laboratories and at the Laboratories of Atomic Energy Commission and several scientific institutions are more amenable to adoption and expansion in the short run for this purpose with the additional advantage that NPSL of PCSIR will in any case be functioning for purposes of primary or basic standards in the country. In the integrated quality control programme envisaged by the Consultants PCSIS Laboratories will have a vital role to discharge. The Consultants visualise that after the integrated programme has been set in motion and both Government and industries and the scientific community are attuned to, it will be necessary to establish an independent standards laboratory basically performing calibration functions. Neither funds nor availability of personnel nor, we may be permitted to add with apologies, the present concept in Government would seem to make it possible to set up this separate Laboratory at the moment. It has to wait till after the existing institutions have been streamlined and the coordinating authority has properly established itself. As short term proposal therefore the Consultants are of the view that Commercial and tertiary calibration services should also be the function of PCSIR Laboratories which should make use of their existing infra-structure and personnel facilities and utilise the facilities available at other places including CTL.

30.02 PCSIR in any case would be in a better position to perform echelon 2 functions namely inter laboratory references standards and laboratory standards used by standard laboratory to calibrate equipment of laboratory standard which usually consists of properietary bridges with built in standards and sources of frequency. As regard echelon three, namely working

standards used in industry for calibrating production line equipment used in quality control, which some times are calibrated in situ and some time referred to a central standard laboratory, PCSIR with its growing liaison and contact with industry in general should be able to perform the following functions quite adequately:

1. To establish a link with NPSL to enable the units of measurement requirement to be maintained for calibration purposes.
2. To supervise the calibration of equipment at all levels by maintaining calibration schedule of all the equipment used.
3. To calibrate the working standards used in industry for the calibration of factory test equipment.
4. To advise on errors of test methods and to suggest new necessary methods.
5. To design and develop standards where these are not available commercially.
6. To assist R&D and testing laboratories in industry and Government agencies to make measurements where a high degree of accuracy, stability and control of environment are needed.

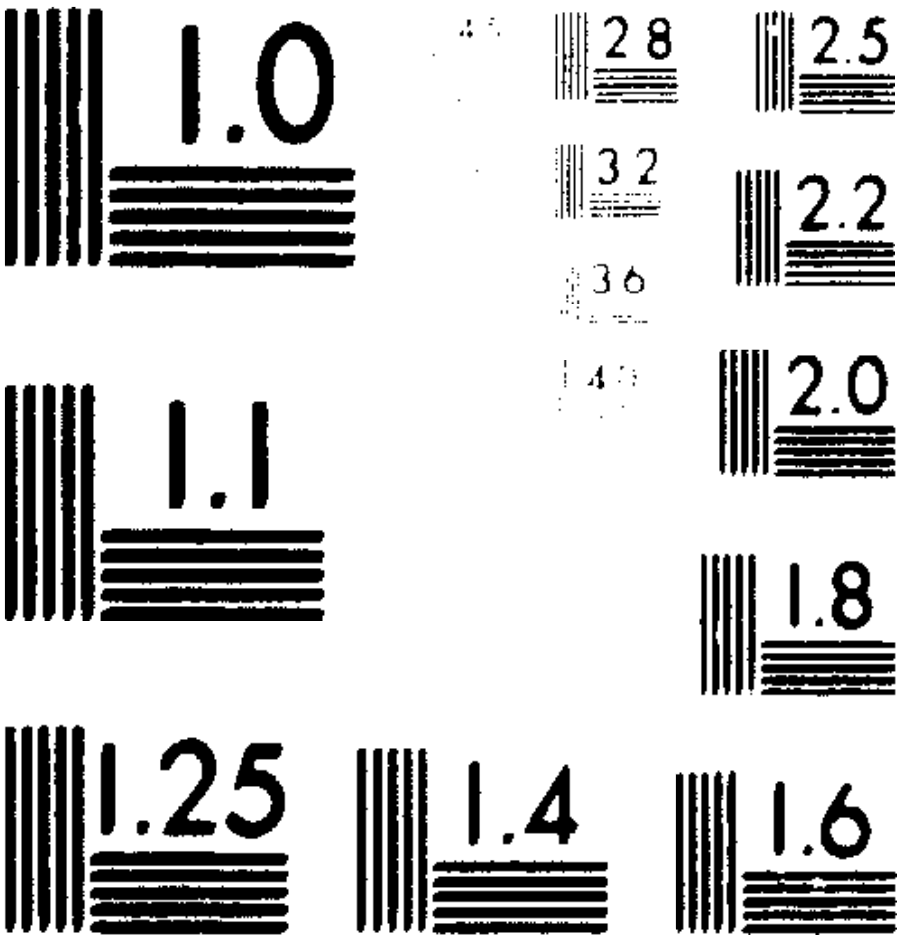
31.01 Both in the Project document, in discussions with CTL authorities and in the Ministry of Industries as well as in discussions with the UNIDO experts considerable emphasis has been laid on the question of absence of legal cover for the functioning of the CTL.

LEGAL COVER FOR CTL'S OPERATIONS.

It has been stated that the idea to establish a Government Test House at Karachi on the pattern of Alipore Test House was to have a statutory body which could test and report on the quality and grade of the samples in regard to purchases made by the Government

and semi-Government agencies and Autonomous bodies. Without prejudice to anyone it was apprehended that as the private laboratories or departmental laboratories may be amendable to outside pressure and may lack creditability. In case of disputed samples tested by other laboratories referred to CTL a tremendous responsibility devolves on CTL. If CTL has to co-ordinate the activities of other laboratories it is not possible without a legal basis. Indeed if dragged into court CTL may find itself without any locus standi. It has been suggested that if statutory cover were available to CTL it would be incumbent on Government and semi-Government agencies to utilise the facilities available to CTL.

31.02 **Surprisingly** in the context of the proposed ordinance for creation of Pakistan Testing, Standards and Quality Control Authority Ordinance also the view has been taken that in the absence of legal cover the Central Testing Laboratories are unable to discharge their functions as aimed at. Some what mistakenly it has been assumed that the Alipore Test House is the sole authority to the Government of India in the matter of quality control and that it functions under statutory cover. In point of fact as has been clarified above it is not so and the real authority for quality control in India vests in Indian Standards Institute which has its own laboratories for standard implementation and certification marking responsibilities and what is more for pre-shipment inspection. In Pakistan, as we will further point out later, the responsibilities for pre-shipment inspection are proposed to be delegated to private registered and accredited pre-shipment inspection agents under the Ministry of Commerce. So far as products and samples referred to CTL by PSI under certification marks scheme are concerned they are adequately covered under



the legal frame work of Certification Marks Ordinance 1961.

31.03 There are many ways to provide legal cover to CTI, in particular, where disputed items are referred to them or where they undertake compliance testing of the investigative testing variety. (This is Compliance Testing where complaints or problems are uncovered.) In the historical context of CTI having been set up as an agency to assist Government in its procurement operations the matter could easily have been taken care of by a provision in contracts of supplies made by Federal Government or Provincial Governments, or semi-Government agencies that in the event of dispute, it would be referred to CTI whose findings in regard to specifications, grade and composition would be final. However, the Consultants would propose in a later part of this report a suitable hierarchy for quality control of which CTI will be an integral part and which should have statutory status of its own. This should take care of such legal cover as is required by CTI. In this context it may be relevant to mention that any other form of legal cover is not available to testing laboratories in other countries. In some countries like Australia and New Zealand the Testing Laboratories whether Government or private are members of a national organisation (Testing Laboratory Registration Council (TLRC) in New Zealand or National Australian Testing authorities (NATA), which ensures ethics, integrity and discipline and standards and thus indirectly provides the guarantee to the customer using the services of the laboratory. In the context of the need for overall quality control of which inspection and testing are but ingredients a testing laboratory is judged by the quality of its performance, which in the final analysis is all that is needed.

31.04 The Consultants should not be mis-understood

that they are of the opinion that legal cover would not be a desirable thing. Indeed it would be and whether or not the comprehensive scheme proposed by the Consultants later in this report is accepted or the limited scheme which is essentially one of merger of CTL and PSI as proposed by the Ministry of Industries at present is put into effect the legal cover would be available. The only point Consultants would like to make at this stage is that the working of CTL has been hampered not by the absence of a legal cover but the absence of a political and administrative decision making it incumbant on all Federal Government agencies, Provincial Governments and their agencies and semi-Government Corporations and institutions to utilise the services of CTL for testing and evaluation to the exclusion of or in preference to other laboratories doing similar type of work in the public and private sectors. It should be candidly admitted that reluctance of these agencies emanates not from lack of legal compulsion but lack of knowledge of facilities available in CTL or their experience of working of CTL or occasionaly for reasons of more economical arrangements being available elsewhere. These are factors which can be and ought to be remedied without the so called " legal cover."

EXPOSURE OF INDUSTRY TO CTL FACILITIES AND SERVICES.

32.01 The terms of reference have recognised the fact that industries are not fully utilising the available services in CTL. The fact of the matter is that there is a similar reluctance on the part of public sector agencies and Government Departments. The reasons ofcourse are not far to seek. The users are not familiar with and aware of the facilities available in CTL. There is credibility gap. In the absence of mandatory instruction users resort to what they consider to be the cheapest and quickest source.The general lack of quality

consciousness both among producers and consumers has contributed in no small measure to lack of utilisation of available facilities not only in CTL but available elsewhere in the country. Other scientific institutions have not fared much better and inspite of decades of efforts no effective liaison has yet been established between universities, institutions carrying out research and industry. Lately there have been some welcome moves like the open houses recently organised by PCSIR laboratories at Lahore and Karachi. After necessary improvements have been made and upgrading effected, it will be useful to organise 'open houses' at CTL also and arrange seminars at which the procedures and facilities available in CTL are brought home to present and potential users.

EXAMPLE FROM NT HOUSES IN INDIA IN LIAISING WITH INDUSTRY.

32.02 In our overview of quality control programme we have indicated the various measures which must be taken for making Total Quality Control 'movement' a success. CTL is a vital link in the chain and must benefit from any such programme. However, on its own CTL can do quite a lot as suggested above. It is somewhat surprising that though CTL has adopted the pattern of Alipore National Test House some of the useful schemes in operation there have been ignored. For example, National Test Houses in India have Consultative Committees for each of the major divisions comprising experts from Universities/Institutions and Industries, relating to the respective fields of specialisation. The needs and priorities of Indian Industries thus get known and technical activities are adopted to these needs. Besides there are Advisory Committees for National Test House Calcutta and its branch at Bombay meeting under the Chairmanship of Secretary Ministry of Supply (Ministry of Industries in Pakistan) which meet once a year and advise on matters relating to Testing and Evaluation of products in consultation with Government bodies and representatives

of Industries and Commerce. Finally National Test Houses are considered an integral part of scientific set up in India. All these steps should be emulated to end the present isolation of C.T.L. This would not only upgrade the working of CTL but contribute greatly to enhancement in utilisation of its services and facilities.

ADMINISTRATIVE ORGANISATION OF CTL.

33.01 The present organisation chart and working pattern of CTL at Karachi and Lahore may be gauged from Annexure No. XIV and No. respectively. During the past a number of posts have been abolished and efforts are now being made for re-inclusion of those posts in the administrative set up. A number of posts are vacant and it has been reported could not be filled up despite efforts presumably because of low grades and low prospects offered to new candidates. At the same time for its future set up CTL has proposed a vastly enlarged organisation for Karachi and Lahore as at annexure XII,a,b,c, and has proposed to set up new laboratories at Quetta and Peshawar with a similar staff structure and organisation as in Annexure XIII, a, b, c.

WORK LOAD OF C.T.L.

33.02 It is necessary to get an idea of the work laod before we can determine the sufficiency or insufficiency of personnel as sanctioned or in position or those now proposed.

33.03 At Annexure XV is given a statement which shows the number of samples tested at Karachi yearwise from 1951 to 1980. At Annexure XVI and XVII is the break-up of these figures along with revenue earned from July 1975 to March 1981 for Karachi and Lahore for the main divisions and sections, namely, chemical, building material and cement, physical and textile for Karachi and chemical, cement, physical and textile for Lahore (It may be noted that fee rates were doubled in 1977-78). At Annexure XVIII is given a statement for some years which gives out the break-up between Govt., Semi-Govt. and private sector sources from which samples were received.

The relationship between samples and revenue

is not well established, partly because of the variety of samples and the schedule of fees being related to each variety. For purposes of our present examination we may largely go by the number of tested samples since say 1975-76. If we ignore the drop during the last 2 years the average number of samples would come to 7000 at Karachi and to over 5000 if we take the average of the six years.

TIME AND MOTION STUDY AND YARD STICK FOR WORK LOAD

33.04 The difficulty is that no proper time and motion study has been carried out in Central Testing Laboratory which would indicate the time which is taken or which should be taken in the testing of the main types of samples received by CTL. In the time originally contemplated for the present assignment it was not possible to carry out such a time and motion study. We give in Annexure statement of such study carried out for two items such as canvas washing soap and paint.

O. & M. STUDIES ON CTL KARACHI'S STAFF REQUIRMENTS.

33.05 The only thing we have to go by is the study carried out by an O.& M. Officer in November 1970 for CTL Karachi. Earlier a similar study had been carried out by another O.& M.Officer at Dacca Regional Laboratory in July 1969. The main conclusions of Mr. M.A.Majid Section Officer O.& M. Wing Establishment Division for Dacca Laboratory were as follows:

i) Physical : Physical test of samples on an average requires 3 man-hours. One examiner therefore can test 2 samples a day or 50 samples a month or 600 samples a year.

ii) Chemical : Chemical test of a sample needs 12 to 14 man-hours. On that basis one examiner can test about 150 samples a year.

iii) Textile: Test of one textile sample needs about 9 man-hours and on that basis one examiner can test about 200 textile samples a year.

Senior Examiners are required to guide and help the examiners in their testing operations. Functions of Assistants Directors are supervisory in nature and they are required to test at least 10 percent of samples already tested by the examiners.

33.06 In the Karachi study more or less the same yardstick had been adopted. Taking the testing of cement as typical in the physical wing it was estimated that one examiner will test one sample in three hours and two in six hours day. Similarly for chemical test 12 to 14 man-hours have been computed or 150 samples a year and for textile 9 man-hours or 200 samples a year.

33.07 These computations were seriously contested by the then Director CTL in 1971. According to him it is very difficult to assess accurately the staff requirements on the basis of samples received for test because the nature of samples received is quite divergent. Time required varies from sample to sample. According to him even in textile division one type of sample may require two man-hours, another 5 man-hours and a third 10 man-hours. Similar computations have been made for different types of samples in other divisions and sections. Unfortunately no record is available as to how this computation was made, if it was not based on value judgement. However for what it is worth it is produced in abstract form as Annexure XXI . Our difficulty is that inspite of best efforts we have not been able to find any such break-up of various types of samples in recent years and are therefore obliged to go by the standards found acceptable by the O.& M. experts at Dacca and Karachi which we found reasonable. At the same time we would urge that a Time and Motion Study

be carried out either by a Team of O.& M. Wing of Government of Pakistan and a representative of PCSIR or through Consultants. It will take a minimum of two months.

33.08 The role and functions of Senior Examiner, Assistant Director, Deputy Director need to be better understood. The Senior Examiner must play a more direct role in testing and indeed should constantly be associated with it. They should be concerned with supervision and as we have mentioned in the testing procedure each test report should bear their signature. The Assistant Directors are at present involved in the testing at an earlier stage when the samples pass through them and they may have given directions to Senior Examiners and Examiners and later when they carry out 10% routine check. We will give our justification for the post of Senior Examiner, Assistant Director and Deputy Director later after the basic requirements of examiners are determined.

33.09 As we do not have any break-up of different types of samples for various sections in recent years, it is reasonable to go by the yardstick suggested by the O.& M. Experts in 1969-70 which still hold good, as little has changed since then. Taking then the yard stick laid, the number of samples on an average on the chemical side from 1975-76 to March 81 were 6721; rounding it off and allowing for samples received during April-June 1981 for which figures are not available the average number of samples come to 1200 per year. This means on the basis of 150 samples a year per examiner, the need is for 8 examiners on the chemical side. On physical side including building material and cement the average would work out to about 1656 samples per year. On the basis of 600 samples a year the requirement works out to 3 examiners. For textile, the average comes to 2700 samples

per year and on the basis of 200 textile samples per examiner per year the requirement come to 13 examiners. It may be noted in this connection that there has been a sharp drop in textile samples from 4350 in 1978-79 to 533 in 79-80. The fault here is not that of CTL but this has been due to extraneous causes. These have been years of depression in the textile industry and production had fallen off. Essentially however due to change in the excise duty structure in 79-80 when excise duty for various counts of yarn was made uniform reducing disputes or causes requiring references for determination of rebate, references to CTL of textile samples were considerably reduced.

37.10 It will be seen that the present sanctioned strength of CTL according to the budget 80-81 is as follows:

Director	1
Deputy Director	2
Assistant Director	5
Senior Examiner	6
Examiners/Foremen/ Gauger	25

We do not know yet of the budget sanctioned for 81-82 but in the estimate it was proposed to reduce the posts of Senior Examiner to 4 and of Examiner to 15. In point of fact even the sanctioned posts are not all filled in, for example, one post of Deputy Director has been lying vacant since 1973 when the incumbent was transferred to Lahore. Two posts of Assistant Director have been lying vacant since long. Of the six posts of Senior Examiner only three are occupied and of 24 posts of Examiners only 13 are occupied.

CONSULTANTS RECOMMENDATIONS ABOUT STAFF REQUIREMENTS.

33.11 With the situation as given above it is futile to recommend any increase in staff but it will be seen that on the basis of work load the sanctioned strength is justified. However the Consultants would like to urge that following matters may be taken into consideration in determining the present staff requirement:

1. There is inadequate supervision of the basic worker, namely the examiner and he is neither adequately supervised nor properly guided. It is therefore essential to increase the number of supervisory staff whose duties should involve themselves in carrying out actual testing, random checking besides constant guidance.
2. Once certification marking scheme is activated whether through the scheme under contemplation in the Ministry of Industries or through the Authority later proposed by the Consultants there would be considerable increase in work load of CTL arising from samples and stores and products sent to CTL by the Licensing Authority. These references will be in the nature of disputed samples and will require careful test and evaluation and it will be necessary for senior personnel to watch the operations.

Taking the above into account the Consultants would recommend that the strength of CTL at Karachi may be as follows for the present:

1. Director 1
2. Deputy Director 4

Two Incharge of Chemical Wing, one for Physical Wing and one for Administration, Finance and Planning.

However, as soon as the instruments proposed by us for chemical and physical wing have arrived and have become operational it will be necessary to relieve both physical and administrative wing of the responsibility of instrumentation, maintenance etc. through a separate Deputy Director.

The Deputy Director is the Head of the Division. The Divisions are organised largely on the basis of disciplines and work independently of each other. Actually his responsibilites should extend to:

i) Ensuring accuracy of Test procedures and sampling conditions
ii) Scrutiny of Tests
iii) Testing of random, disputed and special samples
iv) Technical guidance to Assistant Directors and Senior Examiners and allocation of work
v) Maintenance and improvement of testing methodologies
vi) Participation in meetings regarding Standardisation, Purchases, Inspection etc.

3. Apart from Assistant Directors in-charge of each Division namely Inorganic Division, Organic Division, Mechanical Division, Electrical Division, Building Material Division and Textile Division we would recommend an Assistant Director in charge of Instrumentation and another in charge of Administration, Finance and Planning making a total of 8.

4. As for Senior Examiners, seven will do for the present, six for the six Divisions till they are reorganised or new Divisions created and one for Sample Room.

It may be noted that at one time there were five Divisions in Physical Wing alone namely Electrical Division, Mechanical Division, Building Materials Division, Applied Physics Division and Textile Division. In making

these recommendations we have not taken into account requirements for Leave reserve but this can be ignored for the present.

33.12 In this context it would not be out of place to note that not very long ago, indeed in 1970, the sanctioned strength of C.T.L.was as follows:

Director	1	
Deputy Directors	3	(one for Physical Wing and 2 for Chemical)
Asstt.Directors	7	(3 for Physical, 1 for Textiles, 2 for Chemical, 1 for Adminisration)
Senior Examiners	6	(1 for Physical, 4 for Chemical, 1 for Textile)
Examiners/ Foremen/ Gauger	27	(10 for Physical, 5 for Textiles, 12 for Chemical)
Stores Officer	1	
Librarian	1	
Superintendent for sample branch		
Total staff	119	

including Laboratory and Clerical.

STAFF REQUIREMENTS AT LAHORE REGIONAL LABORATORIES.

33.13 As for Lahore the sanctioned strength for 1980-81 was:

Deputy Director	1
Asstt.Director	2
Senior Examiner	2
Examiner/Gauger	12

In actual practice the post of Deputy Director is vacant and there is only one Asstt.Director and one Senior Examiner in position and only 2 Chemical Examiners out of 8. No wonder in 1981-82 Budget estimates it was proposed to reduce. We do not think this is justified. A look at the number of samples tested at Karachi and Lahore will make the

position clear.

	Karachi	Lahore
1975-1981	32821	60951

These figures would seem to justify at least the same strength as at Karachi if not nearly double. However, the facilities at Lahore are not a patch on Karachi and till such time as facilities are upgraded, infra-structure requirements taken care of, instruments added and experienced staff is recruited an unduly large organisation may prove counterproductive . All that we would urge is that the sanctioned strength of 1980-81 be not reduced and vacancies urgently filled up.

HISTORICAL BACKGROUND OF P.S.I.

34.01 We have mentioned that the task of standardisation was linked with testing in one institution in the beginning. However, in view of the importance of standardisation, the fact that close collaboration was needed with industry and commerce in the task and the pattern generally obtaining in other countries, the considerable expansion of Industrial sector in Pakistan, growing exports of manufactures and other related issues the whole question remained under review. In 1956 the decision was taken to set up a separate Pakistan Standards Institution. However, it was not till 1958 when by resolution No. I. 1-22(1)/58 dated 3rd October 1958 decision to establish the Pakistan Standards Institution as a separate institution to be registered under the Registration of Societies Act XXI of 1860 was notified under the signatures of the then Join Secretary, Ministry of Industries, presently Chairman of consultants. It was registered in the latter part of 1959 and converted into an autonomous body and started functioning as such from April, 1960 at Karachi.

DMINISTRATIVE RGANISATION F PSI.

34.02 The affairs of the Institution are managed by a General Council comprising the President who is the Minister Incharge of the Ministry of Industries, two

Vice Presidents elected from amongst the members of the General Council, one of them being Joint Secretary of the Ministry dealing with the subject and the Director of the Institute being ex-officio Secretary to the General Council. Finances of the Institution are derived from Government grants, contributions from industry, the provinces and the interested bodies, subscriptions from members and sale of Pakistan standards. The membership consist of 3 classes namely sustaining members, ordinary members, committee members. Sustaining members are the various Ministries and Divisions of the Governments of participating countries and organisations, companies and firms and professional and technical institutions. Ordinary members are those individual who are interested in the objects and work of the Institution. Committee members are those persons who serve on the General Council or on a Divisional Council or any Committee of the Institution who are not otherwise a sustaining member or an ordinary member.

34.03 The General Council has a wide membership and in the 3rd meeting on 6th December, 1962 a membership of 66 persons was envisaged comprising Ministries and Divisions of the Central Government concerned, one representative from each province, one representative from DGS&D, Central Engineering Authority, Atomic Energy Commission and Central Testing Laboratory, one representative each from Institution of Engineers, Central Cotton Committee, PCSIR, PIDC, Small Industries Corporation, Food and Agricultural Council, 10 representatives from Federation of Chambers of Commerce and Industry and commerce or other interests specially co-opted, Chairman and one member of each Divisional Council and a few members nominated by the Minister of Industries. There have been minor modifications since the original constitution and some are pending. The members are elected or nominated for a period of 3 calendar years. As mentioned above the affairs of the Pakistan Standards Institution are controlled by the

General Council. In particular the Council is responsible for dealing with reports and recommendations of the Committees, arranging for the publication of standards specifications and codes and collaborating with national standardsbodies in foreign countries and international organisations concerned with standardization. The General Council appoints an Executive Committee with powers to direct and manage the affairs of the Institution subject to the approval of the General Council.

34.04 The work of the Institution is distributed among a number of Divisional Councils such as :

1. Mechanical Engineering Divisional Council
2. Building materials Divisional Council
3. Textile Divisional Council
4. Chemical Divisional Council
5. Agricultural and Food Products Divisional Council
6. Electrical Engineering Divisional Council.

34.05 These Councils are constituted from representatives of the respective interests of users, manufacturers and other persons or bodies concerned in or associated with the industries included in the division and of the Government Ministry or department interested in such industry. It is the responsibility of the Divisional Councils to receive from sectional committees reports and to adopt them or otherwise deal with specifications, codes and reports and to take decisions on the acceptance of draft ISO and ISE recommendations. These Sectional Committees are appointed by Divisional Councils for the preparation of a particular standard or group of standards referred to them by the Divisional Council.

POWERS AVAILABLE UNDER CERTIFICATION MARKING LAWS.

35.01 PSI is also concerned with certification and marking of products as complying with its standards and

and with the international concepts of the subject. Accordingly on 22nd Decmeber, 1961 an Ordinance was issued called the Pakistan Standard Institutions (Certification marks) Ordinance 1961. In this Ordinance "mark" includes a device, brand, heading, label, ticket, pictorial representation, name, signature, word, letter or eral or any combination thereof. Specification was defined as description of an article or process as for as practicable by reference to its nature, quality, strength, purety, composition, quantity, dimensions, weight, grade, durability, origin, age, material, mode of manufacture or other characteristics. The Ordinance confers wide powers on the PSI, in particular, the power to establish and publish Pakistan Standards in relation to any article or process, specify a standard mark, grant or cancel a license for the use of the standard mark, make such inspection of any material or substance as may be necessary and to seek any article or process in relation to which the standard mark has been improperly used. Accordingly the Ordinance provided for prohibition of improper use of standard mark, use of any name which resemble the name of PSI, the use of any mark or trade mark relating to or having reference to "Pakistan Standard " or "Pakistan Standard Specification", power to prohhbit or restrict export of certain articles which do not bear the standard mark and gives the power to regulate generally all practices and procedures connected with the export of such articles. The Ordinance also gives power to the Central Government to prohibit the sale of any article which does not conform to the Pakistan Standard established by the Institution in relation to that article. It ofcourse gives the powers to require any article which conforms to a particular Pakistan Standard to be marked with such distinctive mark. Accordingly the Institution is required to appoint

Inspectors with power to inspect any operation carried on in connection with any article or process in relation to which the standard mark has been used, to take samples of any article or material in relation to which the standrad mark has been used and to obtain all requisite information. Accordingly PSI has so far notified 51 items under compulsory certification marking for exports and 9 items for home market. They are listed in Annexure XXII.

CERTIFICATION LICENSES

35.02 In the beginning the Certification Ordinance was voluntary till 1966. Response was poor and only two units applied for grant of license. In 1966 compulsory certification was laid down according to a phased programme and three Inspectorates (two at Chittagong and Dacca) were established. Annexure XXIII a to c gives the list of lice granted by PSI so far each year and Annexure XXIV lists applications rejected since 1975.

AGRICULTURAL GRADING AND MARKETING

36.01 So far as agricultural products are concerned the Agricultural Produce (Grading and Marking) Act 1937 empowers the Department of Agricultural Marketing to bring the primary c dities under compulsory grading and marking. The lowing primary commodities have already been brought under compulsory grading and marking scheme:

1. Wool
2. Animal Hair
3. Animal Casings
4. Hides and Skins
5. Lamb Skins
6. Fish meal
7. Dry fish and Shell fish
8. Eggs
9. Chillies
10. Oil Cakes
11. Potatoes

12. Citrus Fruits

13. Lime and Lemon

National Grade Standards for bones, onion, garlic, ginger and turmeric have also been finalised. Further work is in progress in respect of Walnut and Mangoes.

PRESENT POSITION OF CERTIFICATION MARKING

37.01 At present more than 600 varieties of commodities and manufactured goods are being exported to various countries of the world out of which only 51 items have been brought under compulsory certification marking scheme for exports and 9 for domestic sales. As we have mentioned the scheme will have to be implemented in full measure and with the introduction of compulsory pre-shipment inspection under an organised system now proposed and the diversification of exports which is currently taking place many new items are sure to be added. However, as has been mentioned above PSI does not have the requisite organisation to carry out the pre-manufacture inspection, process inspection, production inspection and inspection at retailers' level even for the commodities already notified. In view of this we have considered it futile to recommend at this stage new items for the next phase of certification Marks Licensing.

37.02 Once it is realised that certification marking scheme both in voluntary and compulsory systems is an essential requirement of 'standardisation ' and 'quality control' and it is taken up in right earnest in all its aspects under a regular programme all over the country, the load on CTL Laboratories at Karachi and Lahore will considerably increase. The sample testing under certification marking scheme will necessarily have to be a function of CTL in the absence of a laboratory of its own run by PSI though much of the load can be avoided if a properly coordinated scheme is put into effect; for example, specialised laboratories both in the private

and public sector could be utilised for specific items. The centres such as Sports Goods Development Centre, Sialkot, the Metal Development Service Centre, Sialkot, the Cutlery Development Service Centre, Wazirabad, the Marine Fishery Department, Karachi, the Textile Research and Development Centre, Karachi, the recently set up Petroleum Testing and Development Centre of Hydro Carbon Development Institute, Islamabad, the Leather Research and Development Institute the laboratories in a number of public sector industrial units and some private sector industrial units - all can be treated as competent authorities for inspection under certification marks scheme through proper coordination and formal agreements where required. This is the practice in a number of other countries and where there is a centre of excellence in one industrial unit both competence and integrity and security can be ensured even in regard to products of competitive units through a built-in system. The Consultants are encouraged by the fact that if the recommendations for strengthening of staff, provision of infra-structure facilies, training of personnel and installation of essential instruments are accepted, CTL will be able to play its due role in the faithful implementation of certification marks scheme. As it is even at present CTL is well equipped to carry out the tests under PSI Certification Scheme as the Review of facilities required for Testing of Industrial Goods under PSIC MO 1961 given in Annexure would establish.

PROBLEMS OF PSI

38.01 PSI's problems as felt by them are of a different nature. Their main grievance is that while originally the duties were confined to the establishment of national standards they have now been charged with the responsibility for enforcing compulsory certification marking scheme but the staff position to fulfil the constitutional obligations of the institution has remained unchanged. This calls for checking the

production of about 700 industrial units scattered all over the country and they are unable to carry out the visits of inspection to the industrial units. The size of the problem may be judged from the following table:

Type of Industries. — No. of Industries affected after bringing 51 items of export under Compulsory Certification Marks Scheme for export.

	Sind	Punjab	NWFP	Baluchistan
Building Material	10	6	1	2
Chemical Industries	48	27	1	1
Electrical Industries	46	142	1	1
Mechanical Industries	69	333	-	3
Total Industries involved.	173	508	3	7

Industries involved under 9 items of home market under Compulsory Certification Marks Scheme.

Type of Industries	Sind	Punjab	NWFP	Baluchistan
Building Material	2	-	1	-
Electrical Industries	29	37	1	-
Mechanical Industries	100	50	-	-

38.02 According to the PSI rules and regulations PSI has to perform following duties:

1. At least two surprise inspections are to be made to each licensee in a year to check whether licenses is carrying out proper routine tests, inspection and maintaining test records and other

quality control measures to meet the technical requirements as laid down in the relevent PSS.

2. Visits by the PSI Inspectors to apprise the manufacturing units of the benefits of the Certification Marks Scheme and to persuade them to apply for Certification Marks License in their own interest.
3. To collect samples from the open market, dealers' godowns, export consignments and industrial units etc. in order to check whether the products conform to the relevant PSS or not.
4. To examine the test reports received from the testing laboratories and to take further steps accordingly.

For the above stated duties which are to be performed by the Institution, the inspectors of the Institution will have to make visits as shown in the table below: (at least 2 visits per month per factory.

Table - I Exportable items

Name of trade.	Load of Inspection work			
	Sind	Punjab	NWFP	Baluchistan
Building Material	240	144	24	48
Chemical & Agri.& Food	1152	648	24	24
Electrical Industries	1104	3408	24	24
Mechanical Industries	1656	7992	-	72

Table -II Home Market Items

Name of trade	Loan of Inspection work			
	Sind	Punjab	NWFP	Baluchistan
Building Material	48	-	24	-
Electrical Industries	696	888	-	-
Mechanical Industries	2400	1200	-	-

38.03 It will be appreciated that for the control of the above stated industries which relate to the existing 51 items only for Compulsory Enforcement of Standards, the following staff available at the disposal of PSI to discharge the above quoted duties is absolutely inadequate:

i) PSI-Head Office Certification Marks Division.

Designation	No. of Post
1. Deputy Director (C.M.)	1
2. Asstt. Director (Insp.)	2
3. Stenotypist	1
4. Assistant	1
5. Naib Qasid	1

ii) PSI - Inspectorate, Lahore

Name of Posts	No.of Posts
1. Asstt. Director	1
2. Field Officers	2
3. Assistant	1
4. Stenotypist	2
5. U.D.C.	1
6. Naib Qasid	1
7. Chowkidar	1

STAFF REQUIREMENT FOR CERTIFICATION MARKING.

38.04 It will be seen that only two technical personnel in Head Office and there are a similar number at the PSI - Inspectorate, Lahore. It will be observed that the duties

relate to different trades and the area covered is quite vast. PSI Inspectors in the Head Office are required to cover the area of entire Sind and Baluchistan Provinces while the available staff at Lahore is required to cover the area of whole Punjab as well as NWFP Provinces. The field staff is absolutely inadequate compared with the duties and the load of work they are required to perform.

38.05 Moreover, the Government of Sind is also pressing hard to bring all Electrical items which are hazardous to life under Compulsory Certification Marking for home consumption. If the items as recommended by the Government of Sind are brought under the Compulsory Enforcement Scheme, it is crystal clear that the work load will increase manifold and PSI will not be able to fulfil its constitutional obligations. Accordingly PSI has asked for additional staff as given in Annexure - for carrying out their responsibilities relating to certification. We have no difficulty in wholly supporting what is a modest demand. The vacant posts should be filled up and adequate provision made for travelling.

LABORATORY FACILITIES.

39.01 On the subject of Laboratory facilities we quote from the Report of an Enquiry Committee in 1973 as the position has not materially altered:

" Para 74. Among the most important requirements of standardisation are quantitive and qualitative tests. Standardisation and testing are complementary to each other and no satisfactory standards can be formulated on national basis without extensive testing and analycal results. No Standard Specification can be rational and practicable unless tests mentioned in the standards are also practical and economically feasible. It was brought to the Team's notice that so far as the Standard Specifications formulated by the PSI are concerned, practically no testing is done in the preparation of

the standards. Normally the tests prescribed in the foreign standards are incorporated in the Pakistan Standards Specifications. This naturally leads to practical difficulty when Pakistan Standards are sought to be implemented in industry in respect of materials/items for export. The Heads of the Divisions in the PSI agreed that for formulation of Pakistan Standards it was indicated that even in cases where adoption or adaptation is being taken recourse to, the test methods prescribed should be examined for practical and economical feasibility in a Testing Laboratory. They however, indicated that they had to forego this important step in most cases as they had no laboratory of their own which could provide them with adequate testing facilities."

40.01 The Consultants have held several discussions with the present administration of PSI to discuss their concepts of the organisation needed for discharging of their obligations and responsibilities. The set up proposed by them is given at Annexure . Apart from a Director General it envisages two Directors, one for Standards and the other for Certification.

INDIAN STANDARD INSTITUTION.

40.02 We are not called upon in our terms of reference to propose the reorganisation of PSI but we have taken the opportunity of this study to emphasise in the report the vital role that Standards and Certification marking play in quality assurance programme. Some idea of the importance of a Standards Institution in a country may be gauged from the experience of India where I.S.I. is a statutory body under the Ministry of Supplies. During the year 1979-80 the India standards enforced stood at 10,369 and during that year 3617 standards were revised. In the same year the number of ISI licensees rose to 8633 in addition to 950 covering 56 new products. The revenue from sale of Indian Standards and other duties amounted to Rs. 3.56 million and on 31st March 1980 they had as many as 5891 subscribing members. The function of ISI and their methodologies

theoretically are identical with those of PSI except in regard to pre-shipment inspection but with a staff of 1300 (1/3rd technical) and 4 Regional Offices and three branches they carry out 25 - 30,000 Inspections each year. It is interesting to note that as a result of these in-plant inspections Industrial units have themselves gone forward to set up Quality Control and R & D cells and laboratories of their own.

RELATIONSHIP BETWEEN CTL AND PSI.

41.01 The Consultants have held several discussions about the relationship currently obtaining between CTL and PSI and the concepts of the present functionaries. They have also had the benefit of exchanging view on the subject with UNIDO expert and officials of the Ministry of Industries.

41.02 CTL's view is that PSI should not have been separated from Central Testing Laboratories in the first instance. They also feel that if CTL is to continue as a Department under the Ministry of Industries there is little justification for PSI to function as an autonomous body as it is neither a commercial organisation nor a research body/development project. On the side of PSI there is no demand for merger or any objection to the functions of CTL except for the feeling that in respect of some materials the testing fees are out of line or that there is delay or that they are able to get better professional services from other laboratories. The fact of the matter is that there is credibility gap between the two organisations and they are not complementing each other as they might well have,considering their origin, functions and the fact that both are under the administrative control of the same Ministry, namely Ministry of Industries. The Ministry of Industries appear to have been aware of this position because they have been considering the idea of merger of the two institutions under a common Director General as a solution.

41.03 It needs only to be mentioned at this stage that the present arrangements are replica of the arrange-

ments in India with this difference that the India Standards Institution has established its own well organised laboratories and has also on its call well equipped laboratories in the Industries and private sector in addition to Central and regional testing laboratories functioning under Government auspices. In addition the Indian Standards Institution has also been charged with the task of implementing the pre-shipment inspection scheme.

ARRANGEMENTS IN OTHER COUNTRIES.

41.04 The Consultants have examined the arrangements prevailing in other countries also particularly in the Asian region and in most cases there are separate standards institutions and testing laboratories. In some countries like Iran, Singapore, Korea the standards institutions have their own laboratories not only for purposes of determining and implementing standards but also for research and development. Certification marking is now a common arrangement in almost all developing countries and also in developed countries like Japan, except that in USA there is no national certification system or a national accreditation system at present. On the other hand some of the organisations giving the certifications of marks have almost same status as the national certification system has. The National Bureau of Standards in USA was originally established to push the idea of having national standards and national measurements to give people quality assurance in different regions of the United States and now it is being turned to foreign trade and export.

In Sri Lanka pre-export inspection scheme is administered by Bureau of Ceylon Standards. National Bureau of Standards of Taiwan grants Chinese National Standard (CNS) while Bureau of Commodity Inspection and Quarantine (BCIQ) ensures quality of products for export.

42.01 In the light of these factors there can be no quarrel with the present functions of PSI and if PSI has not been able to play its expected role in standardisation and quality control despite a dedicated Director as its head the reasons are that it has not been provided with staffing both in number and quality which is essential for discharging its onerous functions. While Government are going ahead with a Quality Control Ordinanee making it incumbent on industries of a certain size to establish quality control and development cells and laboratories in these units as a minimum requirement, the experience of other countries would leave no manner of doubt that a mandatory scheme of surveillance through an institutional arrangement based on national standards and certification marking would be inescapable.

PCSIR AND STANDARDISATION.

42.02 We have recommended that calibration service pending the set up of a National Standards Laboratory as a long term measure should be the function of PCSIR through its own laboratories and through CTL, other laboratories and other scientific organisations in both private and public sector. By the same token we are inclined to feel that at this stage PCSIR should be able to play an effective part in standardisation programme. We recall that as long ago as 1960 the Scientific Commission had envisaged that the Central Testing Laboratories should be brought within the folds of the constituent Councila of the Pakistan National Science Council. As mentioned elsewhere in many countries the standard laboratories are merged with and are an integral part of the Research and Development Organisation and in any case wherever quality control is being implemented under an integrated plan there is close liaison, coordination and collaboration between

the standards functions and research development. In New Zealand the Department of Scientific and Industrial Research (similar to our PCSIR) is also required to provide for national testing, calibration and analytical facilities.

42.03 CTL is not really functioning as an R&D laboratory and the mandatory participation of representatives of CTL in the consensus processes has developed into a routine. The unfortunate fact is that Pakistan National Standards do not go through the mill of research and tests which is an essential requirment. It would be pertinent to recall that National Test House at Alipore in India with its hoary history dating back to 1912 and vast paraphernalia of Laboratories is only charged with "Research and Development on Industrial Problems relating to Testing and Evaluation", Development of Testing method and "Import Substitution. I.S.I. has its own Laboratories. In this view of the matter PCSIR Laboratories and other research and development laboratories in the country would seem to be in a better position to assist PSI in 'Standard' formation and in the constant revision that is a desitae of standard formulation. After exchanging views on the subject with the Chairman of PCSIR we feel that this additional load can be taken up by PCSIR without impinging on their scientific and industrial research. We do not apprehend that this would in any way adversely affect the working of PCSIR. On the contrary the consensus standards based on testing and endorsement by PCSIR would gain greater acceptance by industry and trade within the country and customers abroad.

ORGANISATIONAL SET-UP OF PCSIR.

42.04 A word about the organisation and Administrative Structure of PCSIR will not be out of place as it would establish that with their organisation and the

range of their operations they are fully capable of undertaking the work entrusted to them.

PCSIR Headquarters are located at Karachi and the R & D operations are carried out by four subsidiary laboratories, two located in Karachi and one each at Lahore and Peshawar. A Directorate of Industrial Liaison is located at the Headquarters. A necleus for the establishment of National Physical and Standards Laboratory has been made at Islamabad. A diploma granting institute in Precision Mechanics and Instrumentation, namely, the Pakistan Swiss Training Centre is located at Karachi. It has a Publications Branch which brings out a technical journal 'Pakistan Journal of Scientific & Industrial Research' and technical bulletins and brochures etc.

The organisational set-up of the laboratories/ centres/institutes is as follows:-

I. Karachi Laboratories

Divisions

i) Pharmaceutical and Fine Chemicals
ii) Agro-Industrial Chemicals
iii) Applied Physics, Electronics and Instrumentation
iv) Marine Food and Applied Biology
v) Chemical Engineering, Design and Development
vi) Polymers and Plastics
vii) Workshop and
viii) Industrial Liaison Section

II. Lahore Laboratories

Divisions

i) Ore Processing and Metallurgy
ii) Food Technology and Fermentation

iii) Glass and Ceramics
iv) Industrial Organic Chemicals
v) Chemical Standards and Testing
vi) Oils and Fats
vii) Chemical Engineering, Design and Development and Section in (a) Workshop (b) Solar Energy and (c) Industrial Liaison

III. Peshawar Laboratories

Divisions

i) Natural Products and Fine Chemicals
ii) Minerals and In-organic Chemicals
iii) Fruit Technology
iv) Natural Fibre Technology
v) Industrial Liaison Section

IV. Fuel and Leather Research Centre, Karachi

Divisions

i) Fuel Technology
ii) Leather Technology

V. Pak-Swiss Training Centre, Karachi

Divisions

i) Training
ii) Production
iii) Instrumentation.

VI. National Physical Standard Laboratories, Islamabad

PSI AND QUALITY CONTROL

43.01 The Special Committee referred to elsewhere in the report set up by the Federal Export Promotion Board had recognised the need of strengthening PSI but Government have felt that as it would take time they should bring out an Ordinance to force the industries to set up their own quality control and development cells.

The Consultants would only like to warn against any feeling developing that one is a substitute for the other.

43.02 While the technical personnel for manning the 6 divisions of PSI concerned with formulation of standards may be gradually increased under a phased programme the urgency of creating a suitable organisation for implementation of the certification marks scheme should not be missed. The staff proposed for this purpose is minimal and the Consultants would entirely endorse the need for additional posts proposed for implementation of certification marking scheme. As in the case of C.T.L. consideration will also have to be given as an urgent measure to provide incentive for technically qualified persons to join P.S.I. at least by offering higher starting salaries in the prescribed grades. Annexure XXVII gives number of Pakistan Standards finalised between 1979-1980.

OTHER LABORATORIES IN PRIVATE AND PUBLIC SECTOR.

44.01 There are a number of laboratories in both private and public sector which are equipped for testing and in some cases for R & D work. We append a list at Annexure XXVIII. It is by no means exhaustive. We do not propose in this report to give a detailed description of the facilities obtaining in each of these laboratories. The National Authority proposed by us will not be exercising any direct administrative control on the functioning of these laboratories which fall under the administrative control of various Ministries, Provincial Governments and other organisations. At the same time the National Authority should have the powers to determine the specialisation in each laboratory, to oversee their functioning, to recommend measures for streamlining and upgrading them, to assist them for this purpose and generally perform the role which organisations of laboratories perform in such countries like Australia and New Zealand. By the same token the authority envisaged for Quality Control and

R & D cells in major industries and Chambers and Associations of industries should be located in the proposed National Quality Control Authority.

44.02 Moreover once all laboratories credited with testing facilities both in the public and pricate sectors are brought into the fold of the Authority proposed by us it would be possible to utilise laboratory facilities both for testing and quality assurance on a basis of specialisation. For example, for water sample reference could always be made to KMC laboratory, for POL products to the recently set up Petroleum Testing Centre established by the Hydro Carbon Development Institute at Islamabad, for textile products to Textile Industries Research and Development Centre, Karachi which was established in 1973 and is fully equipped to analyse and test yarn, cloth, dyes, chemicals and fibres, for leather and leather products to the centre set up for the purpose. We visualise that once the National Quality Control Authority proposed by us is set up its first task would be to make an inventory of the profile and status of available facilities in the country both in the public and private sector. The scope of functions of CTL for routine testing and specialised evaluation can be determined after such a survey has been made taking into consideration all factors such as location, centres of demand, need for specialisation etc.

MEASURES NEEDED FOR NATIONAL CAMPAIGN FOR QUALITY MINDEDNESS.

45.01 A nation wide quality control campaign widely publicising the concept of quality control sustained for a long period would alone bring in manufacturers, top managers down to factory workers, land-owners down to haris, testers, inspectors, marketers, advertisers and consumers to accept control as a national need and creed and as a social necessity.

STEPS NEEDED FOR MAKING QUALITY CONTROL NATIONAL PHILOSOPHY

45.02 In order that quality control becomes a national philosophy the following steps among others are necessary:

1. Establish strong national leadership for quality control.
2. Establish an active national plan through participation and mobilisation of industries both in private and public sector, academics and other professional groups.
3. Mobilise organisations like P.I.T.A.C. and Professional Associations like National Association of Consultants of Pakistan, National Association of Inspection Agencies of Pakistan, Institute of Chemical Engineers, Electrical Engineers, Mechanical Engineers, Hydro-Carbon Development, PINSTECH, Chambers and associations like APTMA, PICRT, Sugar Mills Association etc. to organise syllabi and hold examinations for Certificates on Quality Control.
4. Provide incentive through government purchase of certified products, give price preference and provide financial facilities and fiscal incentive for establishment of quality control laboratories in industrial units.
5. Effect some government compulsions.
6. Promote industrial application of quality control through seminars, in-plant training programme, consultative assistance etc. in particular through national and regional languages media.
7. Prepare public awareness of quality through fairs and exhibitions, publicity and encouraging consumers association and journals.
8. Expose industrialists and consumers to the existance of facilities and the achievement of R&D and testing laboratories and institutions involved in quality control.
9. Institute trophies and presidential awards for

producers and manufacturers who excel in quality production, where it has been instrumental in raising productivity, in reducing manufacturing and other costs and in improving the marketability of products and services.

45.03 Consultants have taken note of the fact that Quality Control as a national objective has now been accepted at the highest levels in the Government. The time therefore seems ripe for integrating all the various legislative and administrative efforts that are currently beingmade for developing quality control assurance in the country. If an overall view is not taken at the present juncture of what quality control involves and of the parameters of a programme of quality assurance, there is grave danger that not only will the efforts remain uncordinated but they may indeed work at cross purposes and result in duplication and waste. There is neither need nor justification for a variety of legislative measures many of which could well be covered by an omnibus quality control law.

NEED FOR DEVELOPING INTEGRATED PROGRAMME AND CENTRAL AUTHORITY

46.01 It is not within the scope of present assignment to draft an omnibus law for quality control nor would we wish to presume to propose the detailed administrative structure and budgetary requirements of the proposed National Quality Control Authority. At various places in the report we have gone beyond the strict scope of the present assignment to elaborate on various facets of quality control. It is necessary only to re-iterate that an integrated programme of quality control extends to, covers, includes and must necessarily consist of Inspection, Product testing in all its facets namely equipment testing, conformance testing and appliances testing, laying down a National Standard and effective Liaison with international standards organisations like ISO and IEC, Research and development, Coordination and

Control over testing, Quality control and R & D work related to quality control in private sector and public sector organisations and units in the country, Certification marking both for export and products for domestic consumption, Pre-shipment inspection of export goods, Effective control over agencies charged with the task of pre-shipment inspection, Training and last but not the least, Development and Implementation of a sustained programme for developing quality mindedness among producers, manufacturers, trades, exporters, management and workers, scientific personnel and above all consumers.

SINGAPORE INSTITUTE OF STANDARD AND INDUSTRIAL RESEARCH.

46.02 It is interesting to note that the Singapore Institute of Standards and Industrial Research was formerly a technical arm of the Economic Development Board which in 1973 was converted into an Autonomous Statutory body. It formulates Singapore Standards, provides adoption by Industry, undertakes and coordinates, Industrial Research, provides consultancy for Quality Control, carries out Calibration, implements Quality Certification Marks Scheme, is responsible for export inspection arrangements, conducts Training courses for Quality and Productivity and promotes Quality consciousness through nation wide campaign on PQR - 'Prosperity through Quality and Reliability.'

46.03 At first sight it may seem that all this would be too overwhelming a task for a single authority nor are the Consultants oblivious of the difficulties inherent in the situation in Pakistan where the various organisation, institutions and units are under different administrative control. For example, PCSIR and various research councils are under the administrative control of the Ministry of Science and Technology, Pakistan Agricultural Research Council and cotton institutions are

related to the Ministry of Agriculture. Atomic Energy Commission has its own administrative arrangement. Defence Science Organisations and Defence laboratories function under the Ministry of Defence. Laboratories and institutions for building material, the laboratories of Railways, Customs and several others have different administrative link up. The working of the Federation of Commerce and Industries under the Trade Bodies Ordinance is the responsibility of the Ministry of Commerce. The public sector units are under the Ministry of Production. Central Testing Laboratories function as a Department of the Ministry of Industries and Pakistan Standards Institution as a semi autonomous body is under the control of the Ministry of Industries. Quality production of industrial goods is the direct responsibility of the Ministry of Industries. Pre-shipment Inspection Agencies are proposed to be controlled by the Export Promotion Bureau and the Ministry of Commerce. Agriculture marketing and grading are dispersed over functionaries of the Federal Ministry of Agriculture and Provincial Governments. There are separate boards for cotton, rice, tobacco and new ones are being created such as for Oil seeds. However neither it is feasible nor desirable that functions of these institutions should come under the direct administrative control of the National Quality Control Authority but the Authority should be able to enforce standards and ethics on all laboratories in the same manner as FATA (Federation of Australian Testing Authorities) or the American Society of Testing Materials do though both of them are non-official bodies. As a short term measure it would also be prudent to let agricultural marketing and grading and primary agricultural produce not to be brought within the fold of the proposed National Quality Control Authority though there is no reason why in due course the

Authority should not interest itself with quality co. trol in respect of these commodities also if only because they will continue to be a major source of foreign exchange earning through direct export and because they provide the raw materials for industrial production and quality control begins at the stage of raw material.

PROPOSED FUNCTIONS SCOPE AND ADMINISTRATIVE STRUCTURE OF NATIONAL QUALITY CONTROL AUTHORITY.

47.01 The Consultants accordingly recommend that instead of promulating the Pakistan Testing, Standard and Quality Control Authority Ordinance as at present envisaged a new ordinance may be drafted calling it simply National Quality Control Authority Ordinance. Its chief executive should be a Director General at least with the status of Additional Secretary to the Federal Government. The President of Pakistan should be the President of the Authority (or Prime Minister depending on the consitutional arrangements prevailing in the country). The main thing is that like the Planning Commission and Federal Export Promotion Board national commitment should be expressed through involvment of the Chief Executive of the country.

47.02 Under the Director General to begin with there should be Directorates as follows:

1. Directorate of Inspection.
   This Directorate should also house the Registry of approved Inspection Agencies.
2. Directorate of Laboratories. Central Testing Laboratory should directly come under the administrative control of the Authority. Other testing and R & D laboratories including PCSIR Laboratory and other laboratories (except those which are specifically excluded for reasons of security) will not be under the direct administrative control of the Authority but the Authority will be responsible to oversee their functioning in regard to testing,

standards and related R & D programmes in respect of facilities, methodologies, techniques and training.

3. Directorate of Standardisation. It will function as P.S.I. for formulation of national standards.

4. Directorate of Certification making. Its functions would relate to ensuring conformity of products to Pakistan standards, issuing of licences and implementation of the certification marking scheme.

5. Directorate of Training and Public Relations. This Directorate will be concerned not only with training programme for personnel of CTL and PSI but also of other institutions and laboratories for purposes related to quality control. It will also be responsible for developing quality control as a national philosophy through seminars, and compaigns organised with the help of available media and with other measures required to bring about motivation and acceptance.

6. Directorate of Pre-shipment inspection. (It may be noted in this connection that in India where pre-shipment inspection has been in operation since long it is the function of Indian Standard Institution under the Ministry of Supplies to implement it. It will be an adjunct of Registry of Inspection Agencies and will perform the functions in this regard presently being performed by Export Promotion Bureau.

7. Directorate of Enforcement of Quality Control in industrial units.

8. Directorate of Administration and Finance.

47.03 The Consultants would have wished to suggest that the proposed NQCA may be located in the Cabinet Division which is directly in charge of the President of

Pakistan and it may well be necessary to do so if experience reveals that location in any other Ministry has resulted into administrative difficulties and lack of cooperation by units and organisations functioning under the control of diverse Ministries. To begin with CTL and PSI are already functioning under the Ministry of Industries. Inspection for such federal procurements as is done by the Department of Supplies is also under the control of the Ministry of Industries. It is the main task of Ministry of Industries to ensure quality control of Industrial production. Though functioning as an autonomous organisation, the Authority will be under the administrative control of Ministry of Industries. The Board of the Authority should consist of Minister of Industries, Minister of Commerce, Minister of Science and Technology, President Federation of Chambers of Commerce and Industries and Chairman, Export Promotion Bureau with Secretary Ministry of Industries as Secretary. It should have an Executive Council meeting at least twice a year comprising besides Secretary Ministry of Industries as Chairman and D.G., NQCA as its Secretary the following:

1) Secretary Ministry of Science & Technology
2) Secretary Ministry of Commerce
3) Secretary Ministry of Communications
4) Secretary Ministry of Finance
5) Chairman PCSIR
6) Chairman Pakistan Atomic Energy Commission
7) Vice Chairman Export Promotion Bureau
8) Representatives of Federation and selected Chambers of Commerce & Industries and/or
9) Representative of National Association of Inspection Agencies of Pakistan (NAIAP)
10) Chief Secretaries of Provincial Governments

SUMMARY - CONCLUSIONS AND MAIN RECOMMENDATIONS.

I. TEST, DEFINE AND EXAMINE THE LEGAL STATUS AND FUNCTIONS OF CTL WITHIN THE INSTITUTIONAL FRAMEWORK OF THE STANDARD QUALITY CONTROL AND CERTIFICATION MARKING SYSTEM EXISTING IN THE COUNTRY, AND PREPARE ITS RECOMMENDATIONS IN THIS RESPECT.

i) The functions of CTL have been listed as 15 main functions in the PC-I of the project documents PAK/73/043/K/01/37. Shorn of verbiage and duplication the main functions of CTL are as follows:

1. Testing of industrial and agricultural materials and products for quality, grade and composition with reference to relevant specification/standard (these include materials and products, procured by Federal/ Provincial Governments, Agencies and Organisations, references made by PSI in connection with certification mark licensing or surveillance testing and samples for disputed cases referred by private sector).
2. Assistance to Government agencies in the context of tariff policies, export rebate and determination of excise and custom duty.
3. Testing of materials and products for development and modernisation of industry.

The last named is minimal as is also calibration facility of a limited nature provided to some industrial units.

CTL functions as a subordinate office under the Ministry of Industries and does not enjoy an autonomous status nor has it any legal status perse.

ii) In 1958 the work of standardisation was separated and transferred to Pakistan Standard Insitution which functions as a semi-autonomous organisation under the Ministry of Industries.

PSI is charged with the task of laying down specifications and enforcement of Pakistan standards. In 1961 an ordinance was issued to cater for certification mark licensing and enforcement which was amended in 1975. The responsibility for enforcement of certification marks devolves on PSI. PSI however has no separate laboratory of its own.

iii) There is as yet no calibration service or institutional arrangement in the country. Responsibility in regard to primary (reference) and secondary standards has been allocated to National Physical & Standard Laboratory Islamabad of PCSIR. Responsibilites of weights and measures and enforcement of metrification lies with PSI and Provincial Governments.

iv) Till recently the concept of total quality control and of quality control assurance programme was lacking. In industrial units only a few can rightly take pride in having adequate quality control facilities and implementation arrangements; these have generally been lacking in industrial units in the country. The certification marks scheme has been dormant and ineffective because sufficient finances and personnel have not been provided to PSI. Quality control of export goods has generally been exercised through import and export control regulations and lately through compulsory pre-shipment inspection.

v) Lately the Government of Pakistan have demonstrated a welcome realisation of the need for Quality Control programme and have the following steps under contemplation/ implementation.

a) Effective enforcement of Import and Export Control Act 1960 and Export (Quality Control) Order 1973.

b) More effective enforcement and expansion of activities under Agriculture Produce (Grading and Marketing) Act 1937.

c) Inspection Agencies Registration Ordinance 1981. This has been approved by the Cabinet but rules are under examination. The ordinance is yet to be notified. Under the ordinance Government proposes to have accredited (registered) private Inspection Agencies to perform pre-shipment inspection functions.

d) An Ordinance to provide for quality control, training, process improvement and project development in industrial undertakings in Pakistan(proposed to be promulgated).Every industrial undertaking having a paid up capital of Rs. 20 million or more shall be required to establish within one year a proper quality control and development cell spending not less than 1/2% of the amount of its annual sales on the establishment of such cell. The proposed ordinance is not intended to confine to export goods only.

e) An Ordinance to be called Pakistan Testing, Standard and Quality Control Authority Ordinance. Under this proposed ordinancy an Authority shall be established at Karachi under the administrative control of Ministry of Industries with a Director General having under him Director, Central Testing Laboratory and Director, Pakistan Standard Institution. After the Authority comes into being the Certification Mark Ordinance will be superseded. The main functions of the Authority

will be to check the production of sub-standard goods in the country (the first phase being the items already listed in Certification Mark Ordinance), to inspect and test all purchases made by Government, Agencies and those desired by private organisations to check and inspect goods for import and export, to frame Pakistan Standards and to set up various centres at main industrial towns to carry out necessary inspection/testing.

VI) As mentioned CTL does not enjoy any legal status. It is a misconception surprisingly prevailing even in Government circles that the Alipore Test House Calcutta on the pattern of which CTL was established is the sole authority to the Government of India in the matter of quality control and enjoys legal cover. It is not so. Neither are the National Test Houses India sole authority for quality control nor do they function under any legal cover. Test Laboratories in other countries also do not enjoy any legal cover. In Australia, New Zealand and USA powerful organisations have been established through membership of all leading laboratories and enjoy respect and authority through competence and enforcement of ethical conduct. While legal cover would certainly be of help its absence has not been a constraint to the functioning of CTL. As Government have themselves recognised they can ensure utilisation of CTL facilities by making it incumbent on all Government agencies to make their purchases after obtaining a report from CTL. Similarly purchase contracts can have provision to this effect.

II. PROPER ASSESSMENT OF CTL's RELATIONS WITH ISI

At present there is more or less a complete creditbility gap between ISI and CTL. CTL personnel do participate in meetings convened by

PSI for formulation of consensus standards but really little or no laboratory work is done in the process. Even for product testing or surveillance testing PSI does not always use the facilities of CTL finding it either expensive or unsatisfactory. On the part of CTI authorities there also is a feeling that there is no need for a separate Standards Organisation and the work of standards formulation and enforcement should revert to CTL. This is a surprising state of affairs considering that both organisations are under the administrative control of the Ministry of Industries. The Ministry are contemplating to set up an Authority bringing CTL and PSI under one organisation as parallel Directorates under a Director General. The Consultants have concluded that while CTI has been used for functions of inspection and testing and with the provision of instruments recommended by the Consultants would be fully competent to discharge these functions, they are neither in a position nor would they be so in future to take up work in the nature of research and development, whether for formulation of standards or innovation or development of industry. For this purpose the responsibility should be transferred to PCSIR Laboratories.

III. INVESTIGATE THE ADEQUACY OF EXISTING FACILITIES AND WORKING EFFICIENCY.

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i) In paragraphs 13.01 to 13.06 and in annexures III, IV,V,VI,VII,VIII and IX Consultants have highlighted the deplorable condition of equipment and instruments and have given list of equipment and instruments which should be urgently provided under the Project in both chemical and physical wing to enable CTL to

come into its own.

ii) The building and accommodation for the Laboratories at Karachi and Lahore are inadequate and unsuitable. The Consultants have recommended construction of a new building commensurate with the requirements of a National Testing Laboratory away from the present location somewhere near Karachi Laboratories of PCSIR. However, pending construction of a new building Consultants have recommended in para 14.03 urgent improvements for Karachi and in para 13.06 for Lahore. They have noted with satisfaction that during the period the study has been conducted some of these improvements have been taken in hand like white washing, repairs to doors and windows, renovation of floors, integrating outer corridor as part of the laboratory.

iii) In para 18.01 - 18.03 Consultants have made recommendations for upgrading the library.

iv) The Consultants have made a number of other recommendations relating to imprest and purchase procedure, procurement of stores, transport requirement.

v) In paras 17 and 19 the Consultants have found the present methodologies for sampling and testing to be quite unsatisfactory and not properly organised. They have recommended appropriate methods and proformas.

vi) In para 20.01, 20.02, 21.01, 21.02, 22.01, 23.01, 24.01 the Consultants have made specific recommendations for new administrative arrangement, new forms and new procedures to be followed to achieve streamlining and efficiency.

vii) The Consultants have found that in particular for chemical analysis out dated and time consuming wet

methods have been used so far. This will change with fuller utilisation of atomic absorption spectrophoto-meter.

IV. INVESTIGATE REASONS FOR INDUSTRIES NOT MAKING FULL USE OF THE TESTING FACILITY AND SUGGEST WAYS AND MEANS FOR MOTIVATING INDUSTRIES.

The industries have not been making full use of testing facilities in CTL for a variety of reasons. Firstly they are not fully aware of available facilities and there has been no effort made to develop liaison between CTL and industrial units, chambers, industrial organisation and trade bodies. A programme of ' open houses ' should be started when representatives from industry should be invited to visit the laboratories. However this will produce a negative effect at present because the appearance of the building and equipment is shabby and unimpressive. This should be done only after renovation of building and accommodation and installation of essential equipment through repairs and imports. Finally as in the case of National Test Houses in India and as in the case of ITI, CTL should also have Councils and Committees comprising representatives of industry, both private and public sector, purchase agencies, trade bodies and Government functionaries.

V. DETERMINE THE REQUIREMENT OF THE INDUSTRY FOR TESTING FACILITIES AND TO SUGGEST WAYS AND MEANS FOR STRENGTHENING LABORATORIES AND IMPROVING WORKING CONDITIONS.

There are no special requirements of Industry which cannot be catered for after repairs of repairable equipment, air-conditioning, de-humification and renovation of building and provision of instrument

recommended as mentioned in III above. In due course of time special emphasis will have to be placed for provision of bacteriological and biological testing and more emphasis will have to be given to electrical and electronic testing.

VI. IDENTIFYING AREAS IN WHICH THE EXPERTISE OF THE LABORATORY REQUIRES UPGRADING.

The staff is basically well qualified but is suffering from ennui, indiscipline, lack of encouragement and lack of motivation. They have not been exposed to modern testing practices and till recently have had no exposure to instruments like atomic absorption spectrophoto-meter. Only one official namely, present Acting Director, went out for overseas training some 16 years ago. There is total absence of a management philosophy. The staff should be sent out for Laboratory management training, for technical training, and for particular instruments and techniques. In addition, Senior Examiner level training is required in metallography and electrical testing. It is absolutely essential to appoint a Management Consultant to work with CTL for one year to monitor the implementation of the renovation, upgrading and training programme recommended in the Report.

VII. ADVISE THE PRESENT STAFF STRUCTURE, RECOMMEND ADDITIONAL EQUIPMENTS AND GRADE TRAINING PROGRAMME AND INCENTIVE SCHEME.

i) On the basis of the present work load the sanctioned strength is justified.

ii) However there is inadequate supervision of the basic worker, namely, examiner and senior examiner.

iii) Once certification marking scheme is activated there would be considerable increase in inspection and testing work by CTL.

iv) It is not necessary to inflate the role of CTL in quality control or split basic functions into

many numbers to give a list of 15 functions to justify the present sanctioned strength.

v) If all vacant posts are filled in and the posts recommended by the Consultants added they would be quite adequate for the time being to cater to requirement even if the sophisticated instruments recommended by the Consultants and as contemplated in the project are supplied.

vi) The basic staff proposed by the Consultants for Karachi against the sanctioned strength according to budget 80-81 is as follows:

Post	Budget 80-81	Proposed by Consultant
Director	1	1
Deputy Director	2	4
Asstt. Director	5	8
Senior Examiner	6	7
Examiner	25	25

vii) As for qualification of staff greater emphasis should be placed on those with engineering qualification. There are a number of vacancies to be filled in and persons with engineering qualification can be inducted into the Laboratory against these posts and additional posts proposed.

viii) It is surprising that though the Government have recognised the need of upgrading posts and bringing them into line with other scientific organisation nothing has been done despite recommendations of a Government appointed Committee as long ago as 1973. The Consultants would recommend upgrading of all posts from examiner to Deputy Director at least by one grade and that of Director by two grades. Neither would it be possible to attract fresh recruits without such upgrading nor would it be possible to end the

present frustration obtaining in the staff.

ix) No other incentive is really required except that the share of the testing fees, which should be reviewed after instruments have been installed, should be enhanced for the Laboratory personnel. The present percentage of 30% is quite inadequate. The bulk of 50% should go primarily to examiners and senior examiners. However this should not be a routine and should be given against yard stick for time and competence laid down with regard to various types of posts.

x) The above recommendations with regard to staff strength are more or less adhoc based on O & M studies and the observations of the Consultants made over a short period. The Consultants have recommended a time and motion study to determine the strength required which should be undertaken either by a Committee appointed by O & M Division assisted by scientific personnel or by the Consultants. The Consultants have given proformas as to how such studies have been carried out in other laboratories.

VIII. PREPARE RECOMMENDATION TO UPGRADE AND DEVELOP THE ADMINISTRATIVE CAPABILITIES OF CTL AND ITS INSTITUTIONAL FRAME WORK.

Recommendations made under III to VI above are essential before any upgrading and development of the administrative and technical capabilities of CTL can be expected. As regards institutional frame work if CTL is to continue as a Department of the Government as at present the least that needs to be done is that its status should be revised to that of an Attached Department. The Consultants are aware that though CTL is functioning as a Subordinate Office the Director has been given the status of Head of Department. This kind of tinkering

with the problem is no help. If the recommendations made by the Consultants about the creation of a National Quality Control Authority are not to be implemented in the near future or atleast the Authority envisaged in the proposal of the Ministry of Industries bringing CTL and PSI within one Authority is at least not implemented immediately consideration should be given to sanction arrangements which would enable CTL to function effectively. Recently Government of Pakistan took some steps to remove the difficulties of Geological Survey of Pakistan and the least that can be done for CTL is to ensure similar arrangements such as :

a) Departmentalise the accounts of CTL in consultation with the Ministry of Finance to enable the Department to exercise its own pre-audited control over its expenditure and disbursement.

b) Accord permission to CTL to purchase spares, chemicals and equipment upto a certain reasonable limit within their budget allocation without routing their indent through the Department of Supplies.

c) Authorise CTL to undertake a crash programme of renovation and essential construction of their building and accommodation.

IX. GENERAL : NATIONAL QUALITY CONTROL AUTHORITY.

i) While the Consultants have dealt with the points which they were specially required to cover in their study they would like to emphasise that the original concept of the project should not be abjured namely to assist the Government of Pakistan in establishing a nation wide quality control and certification marking system towards economic and industrial development of the country. Keeping this objective in view the Consultants

have given an over view of what quality control involves, the role of inspection, testing, standardisation, certification marking, metrology and calibration in a quality control pgoramme and the requirement in a developing country like Pakistan for developing an integrated programme of total quality assurance. For this purpose it is necessary to establish strong national leadership, promote an active national plan, mobilise relevant organisations in private and public sector, effect Government compulsions and provide incentives, promote quality consciousness through seminars, exhibitions, fairs, journals, awards and all available media.

ii) Consultants have noted with gratification that quality control is now accepted as a national objective in Pakistan and apart from activation and more effective implementation of existing laws and procedures a number of legislative measures are under contemplation which are ultimately concerned with one or other aspect of total quality control. Some of these are the proposed Ordinance for registration of accredited inspection agencies under the Ministry of Commerce/Export Promotion Bureau for pre-shipment inspection, proposed Ordinance for quality control training, process improvement and project development in industrial undertakings in Pakistan to enforce establishment of quality control and development cells in all industrial undertakings having a paid up capital of Rs. 20 million and more and finally the proposed Ordinance to establish an Authority at Karachi to be known as Pakistan Testing, Standardisation & Quality Control Authority under the administrative control of Secretary Ministry of Industries with a

Director General as its Head having Directorates of Central Testing Laboratories and Pakistan Standards Insitute, to bring under one roof the functions of CTL and PSI including certification marks scheme. The Consultants have noted that along side these measures the function of primary and secondary calibration is entrusted to National Physical and Standards Laboratory of PCSIR. There are a number of laboratories in the public and private sector with adequate inspection and testing facilities. In addition there are a number of research and development and technology centres relating to specialised fields. There is thus a clear need of integrating all initiatives, programmes and facilities to make fullest use of what is available and to avoid duplication and avoidable expenditure. In particular there is great danger that the laudable initiative of the legislative measures under contemplation for registering accredited inspection agencies, establishment of quality control and development cells in all industrial units of a specified size and bringing together of CTL and PSI under one roof will be counter productive and indeed the objective may well be negated if proper coordination is not ensured and an integrated programme under a national Authority not implemented.

iii) Government seem already to have taken a decision to establish what they propose to call the Pakistan Testing, Standardisation & Quality Control Authority. The Consultants feel that in place of the some what limited concept of the Authority which is basically confined to brining under one roof CTL and PSI the concept should be expanded to set up the National

Quality Control Authority on the lines proposed in Paragraphs 47.01 and 47.03. The basic idea is that national commitment should be expressed through the President of Pakistan being the President of the proposed autonomous authority having a strong Board comprising Ministers with Secretary, Ministry of Industries as Secretary and a strong Executive Council with Secretary, Ministry of Industries as Chairman and a Director General as Secretary with Secretaries, Ministries of Railways, Communications, Finance, Science & Technology and Commerce, Chairman PCSIR, Pakistan Atomic Energy Commission, Vice Chairman, Export Promotion Bureau, Chief Secretaries of Provincial Governments, Representaives of Federation of Pakistan Chamber of Commerce and Industries and some major trade bodies and National Association of Inspection Agencies of Pakistan. The Authority will have Directorates of Inspection, Laboratories, Certification Marking, Pre-shipment Inspection, Enforcement of Quality Control in industrial units, Training and Public Relations and Administration and Finance. There need be no fear that this omnibus organisation will become unwieldy or that by virtue of the fact that many of the institutions and organisations are not under the Administrative control of the Ministry of Industries they would not fall into line with the objectives laid down by the Authority.

iv) In the end the Consultants would like to emphasise that while they feel that the establishment of National Quality Control Authority is a must and can only be postponed to the detriment of economic and industrial development of the country the steps recommended for strengthening and upgrading of CTL and for activating certification marking scheme under PSI should be taken up on a priority basis because they would in any case have to be enforced, Authority or no Authority.

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ANNEXURE I

UNITED NATIONS DEVELOPMENT PROGRAMME
Project of the Government of
PAKISTAN

Title	:	Standardization and Quality Control	
Number	:	PAK/73/043/A/01/37	Duration : Two years
Sector	:	Industry (35)	
Subsector	:	Industrial services and institutions (3530)	

Government Cooperating Agency	:	Ministry of Industries Pakistan Standards Institute and Central Testing Laboratories.
Executing Agency:		United Nations Industrial Development Organisation (UNIDO)

Date of submission: 20 September 1974 Starting date: 1 January 1975

Government Contribution: 752,500 (Pak.Rupees)

UNDP Contribution: 215,100 (US Dollars)

I. BACKGROUND AND SUPPORTING INFORMATION

The functions of the Central Testing Laboratories are briefly as follows:-

1) Assess the quality of commercial and industrial products and evaluate them in terms of prescribed regulations and national and international specifications.

2) Examine and test supplies and purchases made by various Central Government purchasing agencies for determination of quality and grade.

3) Examine and test samples received from the Department of Investment Promotion and Supplies, Government of Pakistan and Provincial Departments of Industries, for assessment of quality in connexion with the granting of import licences, etc.

4) Examine and test construction materials as used in government construction of buildings, structures, etc. to determine quality and grade and advise accordingly.

5) Advise Customs and Excise authorities on the quality and exact grade of industrial and commercial goods for application of government duty.

contd.....

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Annexure I (contd)

6) Advise the Tariff Commission on the quality and grade of products of indigenous industries for consideration of tariff concession/protection.

7) Determine exact grade and quality of the various industrial and commercial commodities which were referred by government and the Police Department in connexion with legal proceedings.

8) Advise public and private sector industry and commerce on the quality and grade of indigenous/foreign goods/products/materials.

9) Assist the Pakistan Standards Institute in the formulation of national standards for products/materials.

10) Assist the Pakistan Standards Institute in enforcing the certification marking scheme of products/materials.

11) Provide training facilities to students of local engineering colleges, polytechnic institutes and universities in the fields of testing and measurements.

12) Render technical advice to all government agencies, autonomous bodies, central as well as provincial, in respect of quality, grade and nature of products, materials, goods and other relevant technical matters.

13) Advise the Trading Corporation of Pakistan in respect of exact grade and quality of products and materials to be imported from abroad and/or exported from the country on government account.

14) Assist government departments and agencies, Central as well as provincial, with regard to grade, quality and nature of indigenous materials and products for the setting up industrial units for the processing of a variety of products.

15) Render assistance to industry and commerce, private as well as public sector, with respect to the export of goods and products by means of determining quality and grade of the materials according to national or international specifications etc.

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UNDP/UNIDO technical assistance is required for the three major fields covered by the Pakistan Standards Institute and by the Central Testing Laboratories:

- quality control and certification marking for industrial products;
- modernisation and reorganisation of the testing and quality control facilities; and
- establishment of the national calibration services for weights, measures and measuring instruments.

All these fields of activity, being closely interlinked, complement each other and together facilitate the efforts of the Government of Pakistan to improve the quality of goods and products produced in the country and thereby support continuous progress in industrial and economic development. In addition to the present project, the Government may request UNDP/UNIDO assistance for further developing and strengthening of the above activities in a follow-up phase during the second Country Programme period.

At present both organisations: the Pakistan Standards Institute and the Central Testing Laboratories, being administratively separate bodies under the Ministry of Industries, work in close co-operation with each other and substantively complement each other. It is envisaged that UNDP/UNIDO technical assistance will be provided to both organizations simultaneously in accordance with the objectives of the project and the work plan outlined below.

II. OBJECTIVES OF THE PROJECT

UNDP/UNIDO assistance to the Pakistan Standards Institute and to the Central Testing Laboratories during the implementation of the first and second Country Programmes is to be provided with the following ultimate objectives:

- to assist the Government of Pakistan in establishing and operating a nation-wide quality control and certification marking system in order to facilitate its efforts towards economic and industrial development of the country; and
- to establish and put into operation a national calibration service for weights, measures and measuring equipment used in industry and commerce as an integral part of the National Metrology Service.

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Annexure I ...contd.

Long-range objectives

The long-range objectives of the project are :

a- to improve and modernize the technical facilities available in the Central Testing Laboratories as a technical and instrumental basis for development and extension of the quality control and certification marking system; and

b- to work out and start implementation of a programme aimed at establishing a nation-wide quality control and certification marking system.

Immediate objectives

Related to the long-range objective (a)

1. to modernise and expand testing and supporting facilities in CTL to enable them to perform the functions prescribed by the Government and to meet the growing demand for their services from industries and commerce;

2. to update and develop the sampling and testing methodology used in the testing laboratories;

3. to train the local staff in the application of new methods of testing and quality control and in operation of the equipment;

Related to the long-range objective (b)

4. to survey the existing quality control and certification marking system and outline the programme for its further development;

5. to establish priorities for extension of the Compulsory Certification Marking scheme with a view to covering the most important export commodities as well as the products, whose utilisation could be dangerous for safety and health;

6. to work out a programme of work aimed at creating quality consciousness among producers and consumers, including quality education, and mass-media information.

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Annexure I .....contd.

DESCRIPTION OF UNDP inputs

1. Assignment of International Staff	Location	Starting date	Duration
a) Expert on organisation and setting up testing and analytical laboratories.	Karachi	January 1975	Three months.
b) Three short-term consultants in the three following fields: - Metallurgy products testing equipment. - Electrical testing equipment - Instrumental methods of chemical analysis (spectrography)	Karachi Lahore	January 1975	One month for each consultant.
c) Quality control and certification marking expert	Karachi Islamabad and other locations.	January 1976	Six months
d) Mechanical testing expert	Karachi Lahore	January 1976	Six months
e) Electrical testing expert	Karachi Lahore	January February 1976	Six months
f) Chemical testing and instrumental methods of chemical analysis expert.	Karachi Lahore	February 1976	Six months.

contd.....

Project Budget Covering UNDP Contribution
(in US Dollars)

Country : Pakistan
Project No. : PAK/73/043/A/01/37
Title : Standardization and Quality Control.

	1974 m/m	1974 $	1975 m/m	1975 $	1976 m/m	1976 $	Total m/m	Total $
PROJECT PERSONNEL COMPONENT								
Experts								
Sub-code Total			6	15000	30	75999	36	90000
Mission Costs								
Mid-term project review mission.						2000		2000
Preparatory mission		1500						1500
Sub-code Total		1500		-		2000		3500
Component Total		1500		15000		77000		93500
TRAINING COMPONENT								
Fellowships								
Sub-code Total			18	14100			18	14100
EQUIPMENT COMPONENT								
Component Total				100000		4000		104000
MISCELLANEOUS COMPONENT								
Component Total				300		3200		3500
GRAND TOTAL		1500		129400		84200		215100

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Annexure I .....contd.

Project Budget Covering Government Counterpart Contribution in Kind

(in Local Currency)

Country: Pakistan

Project No. PAK/73/043/A

Title : Standardisation and Quality Control.

	1975		1976		Total	
	m/m	Rs.	m/m	Rs.	m/m	Rs.
PROJECT PERSONNEL COMPONENT						
Component Total		76,250		76,250		152,500
EQUIPMENT COMPONENT						
Component Total		250,000		250,000		500,000
MISCELLANEOUS COMPONENT						
Component Total		50,000		50,000		100,000
GRAND TOTAL		376,250		376,250		752,500

ANNEXURE I

UNITED NATIONS
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION
UNIDO

12 June 1974

Request from the Government of Pakistan

JOB DESCRIPTION
DP/PAK/73/043/11-01/08

POST TITLE	Quality Control and Certification Marking Expert
DURATION	12 months
DATE REQUIRED	April 1976
DUTY STATION	Karachi
PURPOSE OF PROJECT	The purpose of the project is to assist the Government in strengthening and developing the quality control and certification marking activities within the Pakistan Standards Institute.
DUTIES	The expert will be assigned to the Pakistan Standards Institute and will be expected to:

- advise and assist in the determination of current and future trends and patterns for product quality certification with particular emphasis on export products and consumer protection;
- advise and assist in the formulation of a programme for improving and strengthening the certification marking system aimed at promoting and diversification of export of industrial products and application of compulsory certification for goods and products which utilisation could be dangerous or harmful for safety and health of consumers;
- advise and assist in the formulation and application of national standard specification with higher quality requirements for export products and with special requirements for safety and health protection;
- assist in working out a programme of the training of the professional staff required for undertaking the specialised tasks of standardisation and quality control.

- Secure a smooth transition into a Phase II of the project if, as stated under Future UNDP Assistance,

LANGUAGE - English.

-: x :-

ANNEX I

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

UNIDO

12 June 1974

Request from the Government of Pakistan

J O B D E S C R I P T I O N

DP/PAK/73/043/11-05/08

POST TITLE	Expert in organisation and establishment of testing and analytical laboratories
DURATION	3 months
DATE REQUIRED	January 1975
DUTY STATION	Karachi
PURPOSE OF PROJECT	The purpose of the project is to assist the Government in strengthening and modernization of the testing and analytical facilities within the Central Testing Laboratories.
DUTIES	The expert will be assigned to the Central Testing Laboratories CTL and will be expected to: - review the present activities of PSI and CTL and work out recommendations for their improvement and development including suggestions on institutional and organizational matters; - review the laboratories, premises and testing facilities available in the CTL; - assess the present and future requirements of laboratories in laboratory space and premises and assist in planning their development and experience. - work out the recommendations, technical requirement and lay-outs for the laboratory space to be provided for accommodation of the testing and analytical equipment; - advise on instructions and installation of the special supply systems and supporting equipment for the laboratories.
LANGUAGE	English.

ANNEXURE II

REVISED PC-I

PROJECT DIGEST

Name of Project : Standardisation & Quality Control

The project was originally approved in ADP 1974-75 and again endorsed in 1977-78 with increase in cost estimated from Rs. 2.882 million to Rs. 3.309 million. The reactivated cost of the project is Rs. 5.99 million including a foreign exchange component of Rs. 3.99 million.

The objectives of the project are as follows:

Short-term:

1. To modernize and expand testing and supporting facilities in Central Testing Laboratories to enable to perform the function prescribed by the Government and to meet the growing demand for the services from industries and commerce in public and private sectors.
2. To up-date and develop the sampling and testing methodology in the Labs.
3. To train the local staff in the application of new methods of testing and quality control and in operation of the equipment.
4. To survey the existing quality control and certification marking system and outline the programme for its further development.
5. To establish priorities for extension of the compulsory Certification Marking scheme with view to covering the most important export commodities as well as the products, whose utilisation could be dangerous for safety and health.
6. To work out a programme arrived at creating quality consciousness covering producer and consumer including quality education and mass-media information.

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Annexure II.....contd.

Long-range

1. To improve and modernise the technical facilities available in the Central Testing Labs. as a technical and instrumental basis for development and extension of the quality control and certification marking system.

2. To work out and start implementation of a programme arrived at establishing a nationwide quality control and certification marking system.

3. Promote and establish nation-wide calibration Services.

Justification for the Project is given as follows:

1. Improvement and modernisation of existing facilities to promote precision, efficiency and output.
2. Effective enforcement of PSI Certification Marks Ordinance 1961 and amendment thereto in 1975 - to exercise quality control on exportable materials/ products and indigenous industrial production.
3. Improved services to Government Departments in the transaction of their development and non-development activities
4. Improved services for formulation and implementation of import, export and inter-provincial trade policies by the Government.
5. Improved services for formulation of national standards for health, safety and economic development.
6. Improved services in assistance to Custom & Excise authorities in assessment of duty and tax.

contd.....

Annexure II.....contd.

7. Updating and development of the sampling and testing methodology in the Laboratories.
8. Training the staff in the use and applications of modern methods & techniques of testing.
9. Promoting quality consciousness among producer and consumers.
10. Promote establishment of national Calibration Services.

The local expenditure is meant for humidity and temperature control and civil and electrical/mechanical work to be executed through PWD (Pakistan Public Works Department) and purchase of routine equipment and the foreign exchange to be provided by IDC is for purchase of Jerrll ASH Atomic absorption spectro photometer.

ANNEXURE III

CENTRAL TESTING LABORATORIES,
BLOCK No.77, KARACHI

List of equipments which are out of order but repairable.

CHEMICAL SECTION

1.	I/R (MOM) Spectromen 2000	1 No.
2.	Directhromn (Hungry)	1 No.
3.	Flamephotomener (Unicam)	1 No.
4.	Thermostat both	1 No.
5.	Karlfisher	1 No.
6.	Bomb Calorimeter (Adiabatic)	1 No.
7.	Bechman Spectrophotometer	1 No.
8.	Spectrophotometer SP 500	1 No.
9.	Hardness Rocker	1 No.
10.	Spectrograph Hilger	1 No.
11.	Lab. Oven	3 Nos.
12.	Hot Plates	4 Nos.
13.	Refrigerator	1 No.
14.	Fuming Chamber	1 No.

PHYSICAL SECTION

MECHANICAL

15.	Rockwell Hardness tester	1 No.
16.	Plastic Moulder	1 No.
17.	Ultrameter type A 805	1 No.

Contd.....

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Contd.... Annexure III

18.	Incubator (-20 co to 50 co)	1 No.
19.	Balance Avery Scale	1 No.
20.	Circuit Breaker 0-300 Amps	1 No.
21.	Electrical Breakdown tester	
22.	Oven Ac/Dc	

TEXTILE

23.	Uster Imperfection tester	1 No.
24.	Fugimeter	1 No.
25.	Microtone	1 No.
26.	Climatic Chamber Kotterman	1 No.
27.	Bursting strangth tester	1 No.
28.	Bursting strangth tester	1 No.
29.	Ultrasonic instrument	
30.	Spark tester	
31.	Coil comparator	No.6943
32.	Dynstat for Plastic Testing	1 No.
33.	Plastic Bend Testing Machine	1 No.
34.	Plastometer for melt flow index	1 No.
35.	Charpys Impact testing for plastic	1 No.
36.	Izod Impact tester for Plastic	1 No.
37.	Torsion testing for plastic	1 No.
38.	Hardness tester for Plastic	1 No.
39.	Bend tester for Plastic, at low temp.	1 No.
40.	Valve tester Mark IV	1 No.
41.	Water meter testing equipment	1 No.

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ANNEXURE IV

List of equipments in CTL which are irreparable due to long use and non-availability of spare parts.

CHEMICAL SECTION

1.	Gas Chromatograph	1 No.
2.	Polarimeter (B & Stanlay)	1 No.
3.	Polarimeter (Zeiss)	1 No.
4.	P.H. Meter (Cambridge)	1 No.
5.	Conductivity meter	1 No.
6.	Stablizer	1 No.
7.	Flame analyser with Air pump	1 No.
8.	Lovibond colour comparator	1 No.
9.	Radiation monitor	1 No.
10.	Pyrometer	2 Nos.
11.	Recorder for condensation app.	1 No.
12.	Condrodson app.	1 No.
13.	Lovibond Tintometer	1 No.
14.	Ductility of bitumen	1 No.
15.	Oxidation test app.	1 No.
16.	Penetration of bitumen	1 No.
17.	Polarimeter	1 No.
18.	P.N.F. app.	1 No.
19.	Permeabilty app.	1 No.
20.	Sedimentation app.	1 No.
21.	Pre auto Titrat	1 No.
22.	Turbidemeter	1 No.
23.	Lab. Oven	2 Nos.
24.	Muffle furnance	7 Nos.

Contd.....

Contd....AnnexureIV.

25.	Tube Furnance	4 Nos.
26.	Hot Plate	5 Nos.
27.	Centrifuge	3 Nos.
28.	Balance	5 Nos.
29.	Exhaust Pump	1 No.
30.	Viscometer	1 No.
31.	Photocopier	1 No.

PHYSICAL SECTION

(a) Building Materials

35.	Permeability app.	1 No.	England B.M.19
36.	Permeability app.	1 No.	England B.M.17

(b) Electrical

37.	Voltage Stablizer input 185-235 output 220-volts	1 No.
38.	Volt meter 0-300 volts AC/DC	1 No.
39.	Amperes	7 Nos.
40.	Voltmeter	1 No.
41.	Photo-electric colorimel	1 No.

(c) GENERAL

42.	Dry Oven	1 No.
43.	Conditioning Chamber	1 No.
44.	Grease Resistance	1 No.
45.	Drying Oven	1 No.

ANNEXURE V

List of Equipment which has become Obsolete and is to be replaced.

REPLACEMENT LIST

MECHANICAL

1. Rockwell Hardness tester
2. Plastic moulders
3. Ultrameter type a 805
4. Incubator (-20°C to 50°C)
5. Balance Avery Scale
6. Bursting strength tester
7. Dynstate for plastic
8. Plastic bend testing
9. Platometer
10. Torsion tester
11. Hardness tester
12. Water meter testing

ELECTRICAL

1. Spark tester
2. Circuit breaker
3. Electrical break down tester
4. Oven AC/DC
5. Coil comparator
6. Valve tester

BUILDING MATERIALS

1. Permeability test apparatus
2. Electrical water Heater

Contd.....

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Contd....Annexure V

3. Cement Cube moulds
4. Le-Schaltier moulds
5. Electric saw for stone cutting
6. Sieve
7. Vicat apparatus

CHEMICAL DIVISION

List of the equipment/apparatus/machinery to be replaced.

1.	Infra red Spectro Photometer 2000	1 No.
2.	Gas Chromotograph	1 No.
3.	Flamephotometer (Unicam)	1 No.
4.	Polarimeter (B & Stanlay)	1 No.
5.	Stabilizer	1 No.
6.	Bomb Calorimeter (Adiabatic)	1 No.
7.	Flame analyzer with airpump	1 No.
8.	Lovibond colour comparator	1 No.
9.	Radiation monitor	1 No.
10.	Spectrophotometer unicom SP 900	1 No.
11.	Stroblein app for determination of carbon & sulpher	1 No.
12.	Conradson appt.	1 No.
13.	Lovibond tintometer	1 No.
14.	Duitility of bitumen	1 No.
15.	Oxidation test appt.	1 No.
16.	Penetration of bitumen	1 No.
17.	Vapour pressure app.	1 No.
18.	Hardness rocker	1 No.
19.	Permeability app.	1 No.
20.	Sedimentation app. (Sortorious)	1 No.

Contd.....

Contd....Annexure V

21.	Pye autotitrator	1 No.
22.	Turbidimeter	1 No.
23.	Fuming Chamber	3 Nos.
24.	Weainero meter for paint	1 No.
25.	Oven paint corrosion	1 No.
26.	SALT Spray Apparatus for paints	1 No.
27.	CLORIMETER	1 No.
28.	Viscometer Bath: Kinematic:	1 No.

ANNEXURE VI

List of equipment required for Modernisation of the Labs

1. Universal type testing machine.
   a) upto 10 tons
   b) upto 200 tons
   c) Accessories for timber testing
2. Hardness testing of metals
   Brinell Rockwell Vickers (one unit)
3. Fatique, Rupture & Torsion testing machine
4. Bend & Flesural strength testing
5. Non-distructive testing.
   a) Radiographic testing
   b) Ultrasonic testing
   c) Eddy current testing equipment
   d) Dye - penetrant testing
6. Mechanical testing of paper & allied products.
   a) Tensile testing machine
   b) Bursting/Folding strength testers
   c) Puncture testing for paper/paper board
   d) Any other tests as per I.S.O.
7. Mechanical testing of Rubber, Leather and Plastics and allied products.
8. Calibration & Checking equipment for testing machine (tension & Compression type)
9. Hydraulic and Pneumatoc Pressure testing equipment.
10. Precision Torson Balance.
11. Air Compressor.
12. Thermometer for Oven moisture testing type F.D.A.
13. Apparatus for determining cold flex temperature of Plastic conforming to B.S.S. 2782 Pt-1 Method 104 B of 1956.

Contd....

Contd....Annexure VI

14. Hydrometer, accumulator, syringe type shot weighted with rubber suction bulb plastic delivery tube and hydrometer float, sp.gr.range 1-10- 1.30 Cat.No.HT-340.

15. Hydrometer float in use with HT-340.

16. Set Squares, triangles of transparent material with graduations.

    (a) 45° Length of hypotenus 32 cm

    (b) 60° Length of hypotenus 32 cm

17. Bench type. Precision Surface grinder Grinding Capacity.

    i) Without magnetic chuck
    14" x 5½" x 9½" high.

18. Tachometer for both left, right hand drive Readding

    0-500 r.p.m.

    0-5000 r.p.m.

    0-50000 r.p.m.

19. Stopwatch Keyless, in nicle case, main dail - 30 seconds x 1/30 seconds subsidiary 0-15 minutes.

20. Wattmeter. Electro-dynamimeter iron frequency. 30-500 C/s. Current consumption; Current path: 2.5 range 375 mv. & Voltage path:30ma* (5 a range 375 mv).

21. Constant torque Du pont abrasion Machine for Rubber Dust carrying abrasive surface, Speed 34-40 rev/min. Provision of a revolutions conneter according to B.S.S. 903.

22. Test stand No. 104 in use with hardness tester No.108 AR shore A.

23. Checking instrument No.107 for Rubber hardness tester.

24. Electron Thermometer for metals and non metal. Temp. Range: 0-100°c, 0-300° and 0-1300°c according to B.S.S. 3456.

25. Speedo max temp. Recorder with 8" dia 24 hour rotations chart range 0 to 75°c driven by a elect. clock for 200/250 V.A.C. with 100 charts ink.

26. 46 B.S.I. Conversion slides.

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Contd....Annexure VI

ELECTRICAL

1. Voltmeter AC/DC for low, intermediate & high ranges.
2. Ameter AC/DC for low, intermediate & high ranges.
3. Multipurpose - resistance boxes.
4. Rheostat.
5. D.C. Resistance measuring bridge Kelvin Wheatston Combined.
6. AC to DC power units. 250 volts AC - output 50 volts 10/20 impers.
7. Resistance capacitance & inductance measuring bridges.
8. Electrical breakdown tester

   0-5000 Volts A.C.
   0-1000 Volts D.C.
9. Induction meter testing bench upto 100 H.P.
10. Transformer testing bench.
11. Storage batterien testing cabinets.
12. Spark tester for cable.
13. Variac: input 250 volts output 0-275 volts.
14. AVO meters (portable-battery operated).
15. Standards for incandescent lamp.
16. Standards for electrical Resistance.
17. Standard d.c. e.m.f. sources.
18. D.C. generators.
19. A.C. generators.
20. Atmosphere conditioning facilities upto 30 tons capacity.
21. Inspection Gauges and Equipments for lathe machine testing.
22. Photometric determination bench for Lantern and photometer.
23. Rotary standards for

    a) A.C. Single phase Energy meters.

    b) A.C. Three phase energy meters.
24. Complete arrangement for carrying out high voltage test.
25. Air Circuit Breakers testing equipment.

Contd.....

Contd....Annexure VI

26. Adjustable Bimetal Thermastats (Electrical) Max. Temp. 150°C Stem length 10 in Type TS 3 List No. TM-820.

27. Volume Resistivity Apparatus with mercury electordes, gaurd ring, conforming to B.S.C. 2783 pt. 2 Method 202 of 1957 "Methods of testing Plastics".

28. Winding device for cold bend test on plastics. Conforming to B.S.S. 2782 pt-I, Method 104A of 1956.

29. Power factor meters for three phase circuits of balanced load 380 V/5A, 50 C/S Cos.= 0.5 (Lead. to 1 to 0.5 (lag).

30. Electron Thermometer for metals and non metal. Temp. Range: 0-100°C, 0-300°C and C-1300°C according to B.S.S. 3456.

31. Load testing Unit 0-30 A, 220 V according to B.S.S. 3456.

32. Standard Test Finger according to B.S.S. 3456.

33. Low carbon resistance for regulating current upto 300 amp.

34. Portable Thermocouple Poterntiometers Double range. Measuring 0.20 mv x 10 uv and 0-100 mv x 50 uv, accurate to one divis 1.5 B battery with 4 dozens thermocouples and with tables suitable for 0-400°C.

35. Potential sources for use with S-41-246.

36. Neon indicator Lamps, Lamps with built in resistance in plastic housing 1/2" dia-meter supp. voltage 200-250 v.a.c.

37. Resistance thermometer controller, AEI, RT 3/R from 0-1200°c using a 10 ohm thermometer Max. load 12A phase supp.

38. Resistan[illegible]ometer, AEI, PR4, resistance 10 ohm at 0°C length-[illegible].

39. Current transformer for No.2 wattmeter No.7090 measuring range upto 400 A.

40. Clip on Ammeter. Measuring 0 to 15/60/150/600A
0 to 150/300/600 V.

41. Ammeters for A.C. & D.C. Range 10-50-250.

42. Power-Factor Meters for single phase circuits 22 V/5A frequency 50 C/S Cos=0.5 (Lead) to 1 to 0.5 (lag).

43. Reed type frequency Meter in hardwood case. Voltage 220 V. Range 46 to 54 Cps.

Contd....

44. Ruhustrat single phase Regulating auto-transformer. Type TSP with screw driven sliding contact voltage 220 V/50 Cps. control range current.

    a) 0-14 Amps.

    b) 0-36 Amps.

45. Connection resistance meter according to B.S.S. 3456.

46. Temperature Rise Bridge according to B.S.S. 3456.

47. Electron Direct Reading Anemometer for fan testing according to B.S.S.

48. Load Testing Unit 0-30 A, 220 V, according to B.S.S. 3456.

49. Flash tester at 500 V.a.c. (with insulation measurement resistance) Q.103 D/113 according to B.S.S. 3456.

50. Automatic A.C. Stablizer unit T.S.2.

51. The Weton Clipper according to B.S.S.

52. Standard Test Finger according to B.S.S. 3456.

BUILDING MATERIAL

1. Electrical balance - Top loading type upto 5 Kg upto 25 Kg.

2. Stop watch Pocket type Clock type.

3. Precision thoe (hygrometer - direct reading)

4. Precision thermometers.

5. Electrical saw for stone cutting and for concrete cutting.

6. Sand blast apparatus for concrete testing.

7. Turbidithmeter - Fineness test apparatus Wagner type.

8. Accelerated curring tanks.

9. Autogenous curring containers.

10. Combined Compressometer/Extensometer.

11. Soil bearing pressure test apparatus for building construction sites.

12. Marshall test apparatus.

13. Non-destructive testing kit for concrete.

ANNEXURE VII

EQUIPMENT LIST FOR CALIBRATION

Supplier	Item	Type No.		Qty.	a S
A.W. Sullivan	Resistance Standards	43111	0.10hm	2	255
Murray Read	"	43112	1.0 hm	2	255
Orrington IR53QU	"	43113	10 hm	2	255
SIRT ENGLAND	"	43114	100 . hm	2	255
"	"	43115	1000 hm	2	255
"	Industance Standards	1910	100 ull	1	175
"	"	1920	1000 ull	1	175
"	"	1930	10,000 ull	1	280
"	"	1940	100000 ull	1	340
"	"	1950	1,H	1	340
"	Standard Mico capacitor	C1855	0.01 uF	2	300
"	"	C1850	.001 uF	2	300
"	"	C1812	.0,1 uF	2	254
"	Screened Bridge	T1097		1	2,500
"	Decade Capacitance Bridge	C3024		1	5,600
"	Decade Capacitance Bridge	C3060		1	2,500
"	Megohmmeter	Model 29		1	460
"	Milliohmmeter	Model 47A		1	460
"	Potential Divider	T2100		1	1,622
"	Standard Cells HT pe	Cadmium 4125		10	560
Newlett Packard	Frequency standard	5065 A		1	
"	Frequency Transfer	B21-5065A		1	
"	Power Supply	002		1	
"	Wave Analyzer	3595A		1	

Contd...Annexure VII.

Supplier	Item	Type No.	Qty.	a S
Newlett Packard	Digital Valimeter	3460B	1	
"	A.C. Calibration System	745 A	1	
"	Essential spare parts to above,			
Marconi Instruments	Inductor Analyser	2702	1	1,242
	Mixer Unit	8339	1	368
"	DC Power Unit 10A	9306	1	600
"	Remote Switch Unit	9287	1	92
"	Multiplier Unit	D347	1	253
"	Circuit Magnification Meter	TF1245A	1	805
"	Test Jig	TJ230	1	161
"	Differential Voltmeter	TF2606	1	621
"	Essential spare parts to above.			
Textronix	Transister Curve Tracer	576 (fitted with C 12 or C 27 Camera)	1	
"	Programming Accesories	0160518.00	1	
"	Pulsed High Current Tester	176	1	
"	Storage Qseilloscope	564 B mod 121N	1	
"	10 MHZ Dual Trace Amplifier	3 A 6	1	
"	Time Base	3 B 3	1	
"	Time Base	3 B 4	1	
"	Probe 1x	010.0074.00	1	
"	Probe 10x	010.0127.00	1	
"	Spares for above and film for camera			
Baur	Electrostatic Voltmeter for calibration 150XV Oil Tester 7 90 KV			
Rank - Xerex	Copying equipment.			

ANNEXURE VIII

LIST OF EQUIPMENT IN LAHORE
REGIONAL LABORATORY

LIST OF INSTRUMENTS OF CHEMICAL SECTION

S. No.	Description of Apparatus/ Instrument.	Condition of Apparatus.	Nos.
1.	Spectrophotometer DU. (UV & Visible)	In working condition.	One
2.	Flame Photometer	-do-	One
3.	Electro-analyser	-do-	One
4.	Karl Fisher Apparatus	-do-	One
5.	Strohlein Apparatus for Carbon	-do-	One
6.	Polorimeter	-do-	One
7.	Refractometer	-do-	One
8.	Ultrameter of thickness determination of non-ferrous on ferrous material	-do-	One
9.	Potentiometer	-do-	One
10.	pH Meter	-do-	One
11.	Conductivity Meter	-do-	One
12.	Grease Worker	-do-	One
13.	Ductility Meter	-do-	One
14.	Penetrometer	-do-	One
15.	Lovibond Tintometer	-do-	One
16.	Redwood Viscometer No.1 and No.2	-do-	Two
17.	Abel's Flash Point Apparatus	-do-	One
18.	Pansky Martin Flask Point Apparatus	-do-	One
19.	Distillation Apparatus for Petroleum Products	-do-	One
20.	Centrifuge	-do-	One
21.	Vaccum Oven	-do-	One
22.	Fraction Collector	-do-	One
23.	Muffle Furnace	Two are out of order and One in working condition.	Three

Contd.....

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Contd.....Annexure VIII

S. No.	Description of Apparatus/ Instrument.	Condition of Apparatus.	Nos.
24.	Analytical Balance (Metler)	One out of order and One in working condition.	Two
25.	Physical Balance (Metler)	In working condition.	One
26.	Polarograph	Out of Order	One
27.	Bomb Calorimeter	Out of Order	One
28.	Orset Apparatus	Out of Order	One
29.	Water Distillation Apparatus	One out of order and One in working condition	Two
30.	Melting Point determination Apparatus	In working condition	One

LIST OF INSTRUMENTS OF PHYSICAL & ENGINEERING SECTION.

1.	Denison's Compression Testing Machine (200 tons Capacity)	In working condition	One
2.	Avery's Universal Testing Machine (50 tons Capacity)	In working condition	One
3.	Mounting Press (Hand Operated) 5 tons Capacity	In working condition	One
4.	Avery's Tensile Testing Machine (2500 Lbs. Capacity)	In working condition	One
5.	Rockwell Hardness Testing Machine	In working condition	One
6.	Brinell and Vickor Hardness Testing Machine	Out of Order	One
7.	Tensile Testing Machine (100 Kg. Capacity)	In working condition	One
8.	Avery's Dynamic Balancing Machine..		
	i) Capacity 12 Lbs.	In working condition	One
	ii) Capacity 5000 Lbs.	-do-	One

Contd.....

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Contd.....Annexure VIII

S. No.	Description of Apparatus/ Instrument.	Condition of Apparatus.	Nos.
9.	Impact Testing Machine.		
	i) Small.	In working condition	One
	ii) Big.	Out of order	One
10.	Dead Weight Tester (Pressure Gauge Calibration Machine)	In working condition	One
11.	Paper Tearing Strength Testing Machine	-do-.	One
12.	Paper Folding Endurance Testing Machine	-do-	One
13.	Paper Bursting Strength Machine	-do-	One
14.	Rubber Hardness Testing Machine	-do-	One
15.	Micrometers, Screw, Gauge and direct thickness measurement instruments	-do-	Eight
16.	Amsler for calibration of Tensile and Compression Machine	-do-	One

LIST OF INSTRUMENTS OF ELECTRICAL SECTION

1.	Valve-characteristic Meter	In working condition	One
2.	Electrical Oven	Out of order	Three
3.	High Voltage Tester 4 Kv. Range	In working condition	One
4.	Earth Circuit Tester	-do-	One
5.	Copper Conductor Temperature Rise Tester	-do-	One
6.	Lab. Capacitance Bridge	-do-	Two
7.	Twenty Million Megohmmeter	-do-	One
8.	Watt Meter Assembly	-do-	One
9.	Avometer	Two out of order and Two in working condition	Four

Contd.....

Contd....Annexure VIII

S. No.	Description of Apparatus/ Instrument.	Condition of Apparatus.	Nos.
10.	Battery Charges	In working condition	Four
11.	Decade Condensor	-do-	One
12.	Wheatstone Bridge	-do-	Three
13.	Voltage Stablisers - 3 phase	-do-	Three
14.	Voltage Stablisers (with transformers)	-do-	One
15.	Single Phase Stablizer	Out of order	One
16.	Megger for Insulation Resistance 500 Volts D.C.	In working condition	Three
17.	L.C.R. Bridge	-do-	One
18.	High Voltage Tester 5 Kv. Capacity	-do-	One
19.	Transformer Oil Tester Cup Type 60 Kv. Capacity	-do-	One
20.	Auto Transformers	One out of order and six in working condition	Seven
21.	Avery's Weighing Machine 220 Lbs. Capacity	In working condition	One
22.	Anemometer	Out of order	Two
23.	Number of Sesitive Galvanometers ammeters and resistances	In working condition	
24.	Techometer	Two our of order Two in working condition	Four
25.	Long tester for measuring current and voltage and wattage in a live-line	In working condition	Two
26.	Frequency Meter	-do-	One
27.	Hardness Tester	-do-	One
28.	A number of costly instruments and meters relating to the field of electronics are lying unused and no one knows where and how they can be used.		

Contd.....

Contd....Annexure VIII

S. No.	Description of Apparatus/ Instrument.	Condition of Apparatus	Nos.
	LIST OF INSTRUMENT OF TEXTILE SECTION		
1.	Breaking Strength Determination Machine	In working condition	Two
2.	Breaking Strength Determination Machine for Lea	-do-	One
3.	Breaking Strength determination Machine for Thread	-do-	One
4.	Washing Machine	-do-	One
5.	Shirley's Pressure Head Tester	-do-	One
6.	T.P.I. Determination Machine	-do-	Two
7.	Abrasion Testing Machine	-do-	One
8.	Electrolyser	-do-	One
9.	Microscope	-do-	One
10.	Draping Wheel	-do-	One
11.	Microtome	Out of order	One
12.	Projection Microscope	Out of order	One
13.	Diffraction Grating Slides (for direct determination of ends and picks)	Out of order	One set of 10 slides
14.	Balance of direct determination of Count of yarn	In working condition	One
15.	Beesly's Balance for count of yarn	In working condition	One
16.	Drying oven for textile	One out of order and One in working condition	Two
17.	Hygrograph for Relative Humidity and Temperature	In working condition	Two
18.	Balance Electrical	Out of order	One

Contd.....

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Contd.....Annexure VIII

S. No.	Description of Apparatus/ Instrument.	Condition of Apparatus.	Nos.
	LIST OF INSTRUMENT OF CEMENT & BUILDING MATERIAL SECTION.		
1.	Vibrating Machine for making Cubes	In working condition	One
2.	Sieve Shaker Machine	-do-	One
3.	Sets of B.S. Sieves	-do-	One
4.	Electrical Oven	-do-	One
5.	Weatherometer (Temp. & Humidity Control)	Out of order	One
6.	Curing Tank	In working condition	One
7.	Vicat's Needle Apparatus	One in working condition and one out of order	Two
8.	pH-Meter	In working condition	One
9.	Stop watch	In working condition	One
10.	Tensile Testing Machine	Out of order	One
11.	Tri-axial shear determination Apparatus (for soil testing)	Not yet commissioned	One
12.	Bulk Density Cylinders (Two sets of 10 cylinders and 5 cylinders for soil testing)	Not yet commissioned	One
13.	Compaction Test Machine (For soil Testing)	Not yet commissioned	One

ANNEXURE IX

NEW LAYOUT AND DESIGN FOR
CHEMICAL TESTING LABORATORY
CENTRAL TESTING LABORATORIES
- LAHORE

In an effort to re-establish the Laboratory, the Expert has prepared a new layout and design which is attached to this report.

MAIN FEATURES OF THE LAB LAYOUT AND DESIGN

The laboratory room dimensions, which are approximately 14.3 meter long x 7 meter wide, allows a design for a self-contained wet or classical chemical testing laboratory. As the work of the laboratory is fairly a routine one benches can be allocated to specific functions rather than to individual persons.

Three peninsular benches are to be fitted together with two fume cupboards, refrigerator, one cupboard for reagents and another one for apparatus. Two rooms at the North-East end of the laboratory, one for balances and the second as an office, are to be partitioned from the laboratory room.

A. BENCH DESIGN

Adjacent to the wall type of benches:
Height (from the floor) 90 cm.
Length, 300 cm.
Width 120 cm.

Reagent shelf along the centre of the bench is 26-27 cm above the bench level.

Working bay between benches for back to back working persons is 150 cm wide.
Traffic space at end of benches should be 140-180 cm wide.

Bench coating using "modified epoxy finish" type of paint is most satisfactory. Benches top should be covered using a suitably resistant material with respect to alkalis and concentrated acids.

B. FUME CUPBOARDS

The design of the fume cupboards is highly specialized and it is preferable to instal prefabricated factory units than build these up in situ. It should be type "G" fume cupboard for general use, including acid digestions, distillations and chemical reactions. It may be fitted with water, heating gas and electrical outlets.

C. SERVICE FOR BENCHES

I. On the bench side;

2 water outlets for condensers

3 doubled gas outlets

4 power outlets

5 compressed air outlets

II. At sinks;

Hot and cold water

Deionized or distilled water facilities.

Safety shower with flexible hose, one only for the laboratory, so that if acid or other corrosive material is splashed on the body or face it may be quickly washed off.

D. LABORATORY FURNITURE AND FITTINGS

Reagent cupboard; 120cm W x 20cm D x 210 cm H

Apparatus cupboard; 120cm W x 40cm D x 210 cm H

Balance Benches; 75cm W x 75cm H with thick terrazo top resting on rubber strips on a cast concrete base.

Bookcase units; in office only, similar to apparatus cupboard.

Desks; (surface dimensions) 90 cmL x 60 cm W x or 120 cmL x 70cm W.

Metal filing cabinets; 4 drawer units in office.

Steel clothes lockers: in office, 180 x 30 x 45 cm

Contd....Annexure IX.

E. VENTILATION AND AIR CONDITIONING

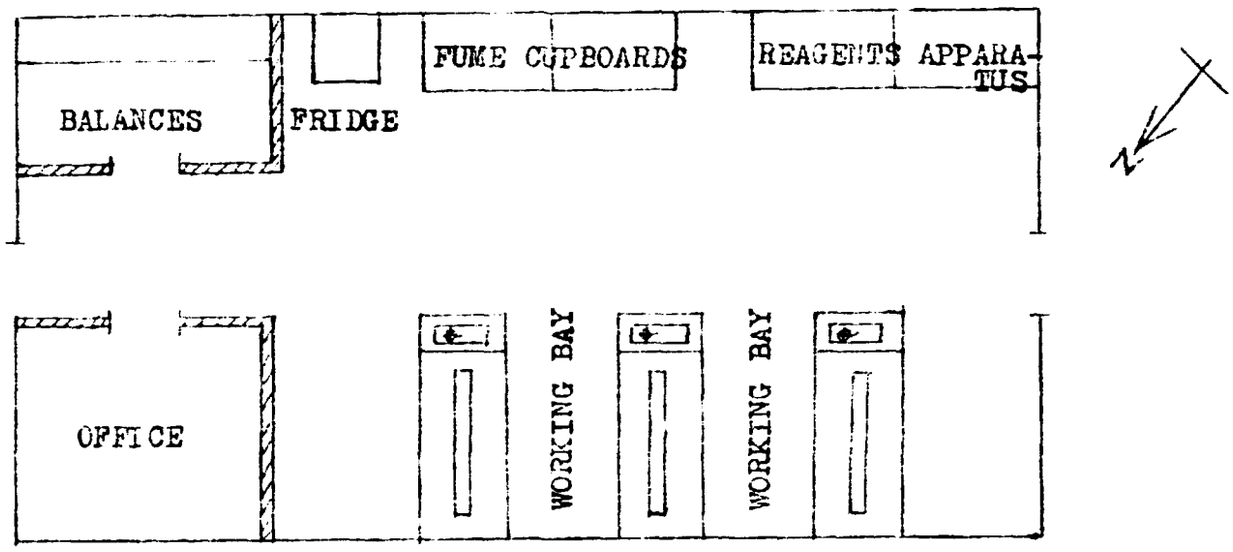
A dust free, humidity controlled and air conditioned atmosphere is required for the laboratory on 24 hours basis. The efficiency of the fume cupboard and the question of the make-up air needed to supply them, will decide whether the air conditioning system is partially or fully recirculated.

F. SAFETY

Refer to "GOOD PRACTICES IN LABORATORIES FOR CENTRAL TESTING LABORATORIES" manual by the Expert.

Annexure IX. (Contd)

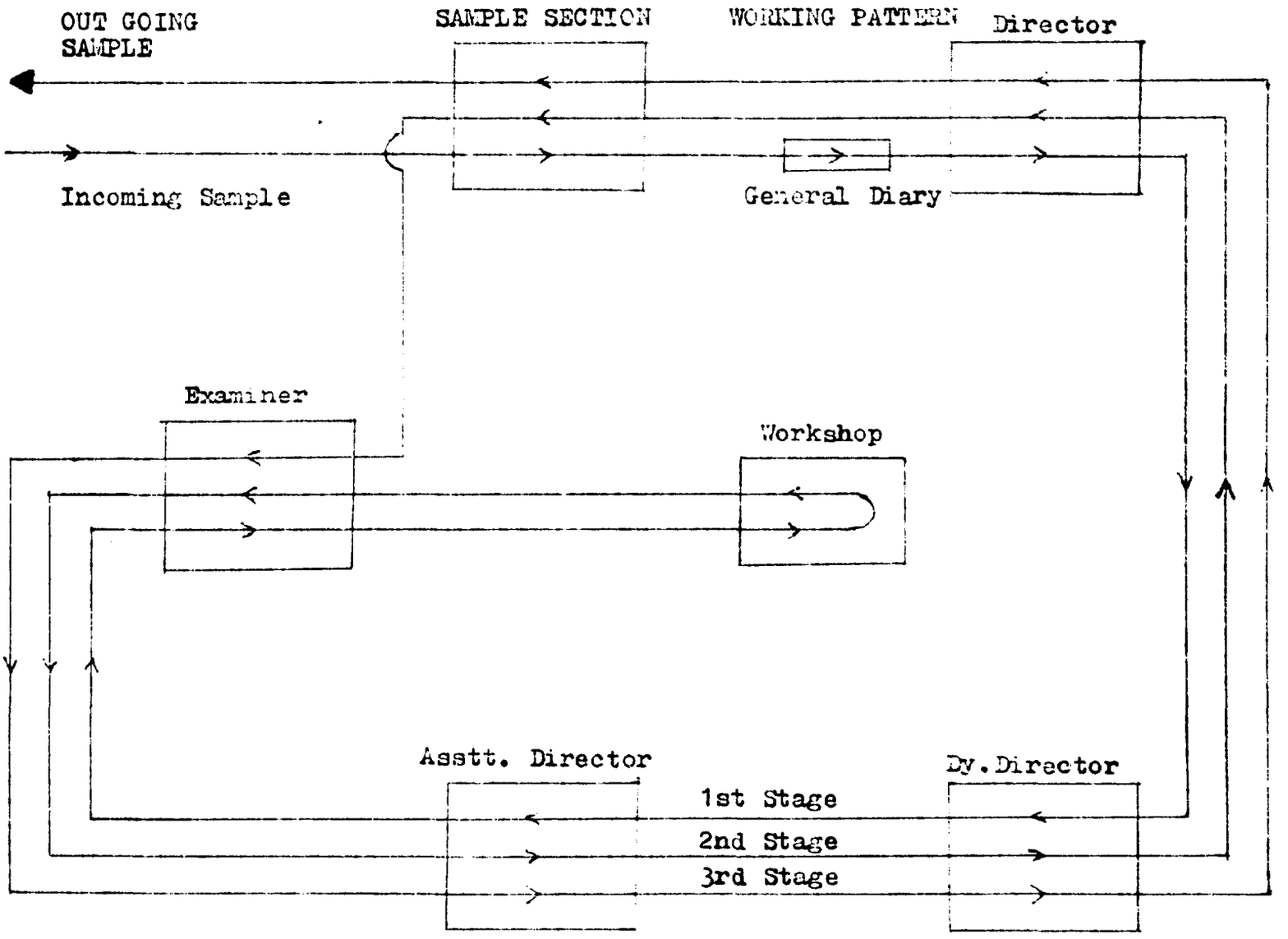
PROPOSED LAYOUT FOR CHEMICAL TESTING LABORATORY
CENTRAL TESTING LABORATORIES - LAHORE



SCALE 1: 100

SAMPLE FLOW CHART

CENTRAL TESTING LABORATORIES KARACHI



ANNEXURE XI

Recommendations made by Technical Committee for Grades and Qualifications of Technical Personnel in CTL

Nomenclature	Grade	Qualification
Examiner	16	B.Sc. (Second Division) in relevant field.
Senior Examiner	17	M.Sc. (Second Division) in the relevant field as an average academic career OR B.Sc. with three years experience in the relevant field in case of departments promotion.
Assistant Director	18	M.Sc. (Second Division) in relevant field with five years experience OR B.Engg. with three years experience in the relevant field or Ph.D.
Deputy Director	19	M.Sc. (or B.Engg. in the relevant field with ten years experience or Ph.D with five years experience in the relevant field.
Director	20	M.Sc. or B.Engg. in the relevant field with fifteen years experience OR Ph.D with ten years experience.
Director General	21	M.Sc. or B.Engg. in the relevant field with twenty years experience. OR Ph.D with fifteen years experience.

ANNEXURE XII
(a)

PROPOSED ORGANISATION CHART OF CENTRAL TESTING LABORATORIES KARACHI/LAHORE

DIRECTOR

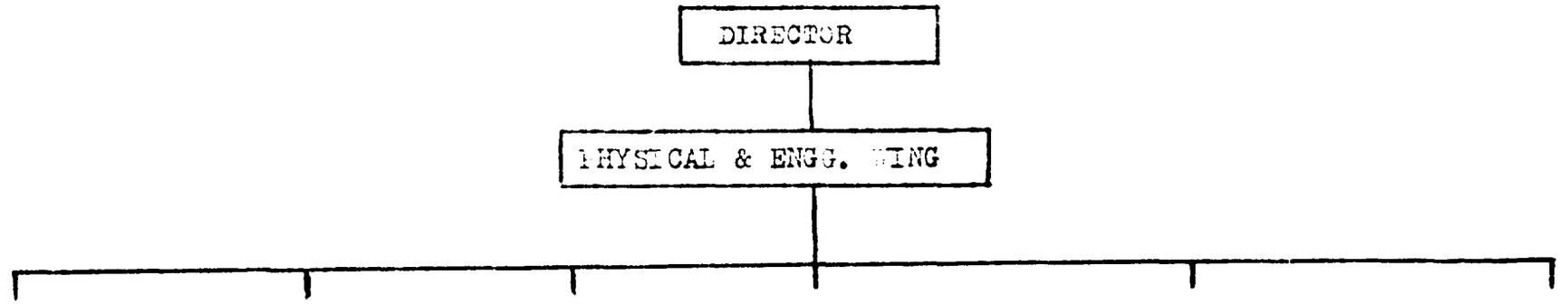
CHEMICAL WING

Inorganic Section		Organic Section		BACTERIOLOGICAL Section		Instrumental Analysis Section		Food & Farm Section	
Dy. Director	1	Dy. Director	1	Dy. Director	1	Dy. Director	1	Deputy Director	1
Asstt. Director	1	Asstt. Director	1	Asstt. Director	1	Asstt. Director	1	Asstt. Director	1
Senior Examiner	2	Senior Examiner	2	Senior Examiner	1	Senior Examiner	1	Senior Examiner	1
Examiner	4	Examiner	4	Examiner	4	Examiner	4	Examiner	4
Lab. Asstt.	1	Lab. Asstt.	1	Lab. Asstt.	1	Lab. Asstt.	1	Lab. Asstt.	1
Lab. Bearer	2	Lab. Bearer	1	Lab. Bearer	1	Lab. Bearer	1	Lab. Bearer	1

ANNEXURE XII

(b)

PROPOSED ORGANISATION CHART OF CENTRAL TESTING LABORATORIES KARACHI/LAHORE



Electronic		Mech. Section		Electrical Section		Textile Section		Building Material Section		Workshop and Maintenance Section	
Dy. Director	1	Dy. Director	1	Dy. Director	1	Dy. Director	1	Dy. Director	1	Instrument Officer	1
Asstt. Dir.	1	Asstt. Dr.	1	Asstt. Dir.	1	Asstt. Dir.	1	Asstt. Dir.	1	Foreman	1
S. Examiner	1	S. Examiner	1	S. Examiner	1	S. Examiner	1	S. Examiner	1	Mistry	3
Examiner	2	Examiner	5	Examiner	3	Examiner	4	Gauger	2	Fitter	1
Lab. Asstt.	1	Lab. Asstt.	1	Lab. Asstt.	1	Lab. Asstt.	2	Asstt. Gauger	2	Turner	1
Lab. Bearer	1	Lab. Bearer	1	Lab. Bearer	1	Lab. Bearer	1	Lab. Bearer	2	Boiler Attendant	1
										Gasman	1
										Armature	1
										Ref. Mechanic	1
										Welder	1
										Painter	1
										Plumber	1
										Glass Blower	1
										Khalasi	4

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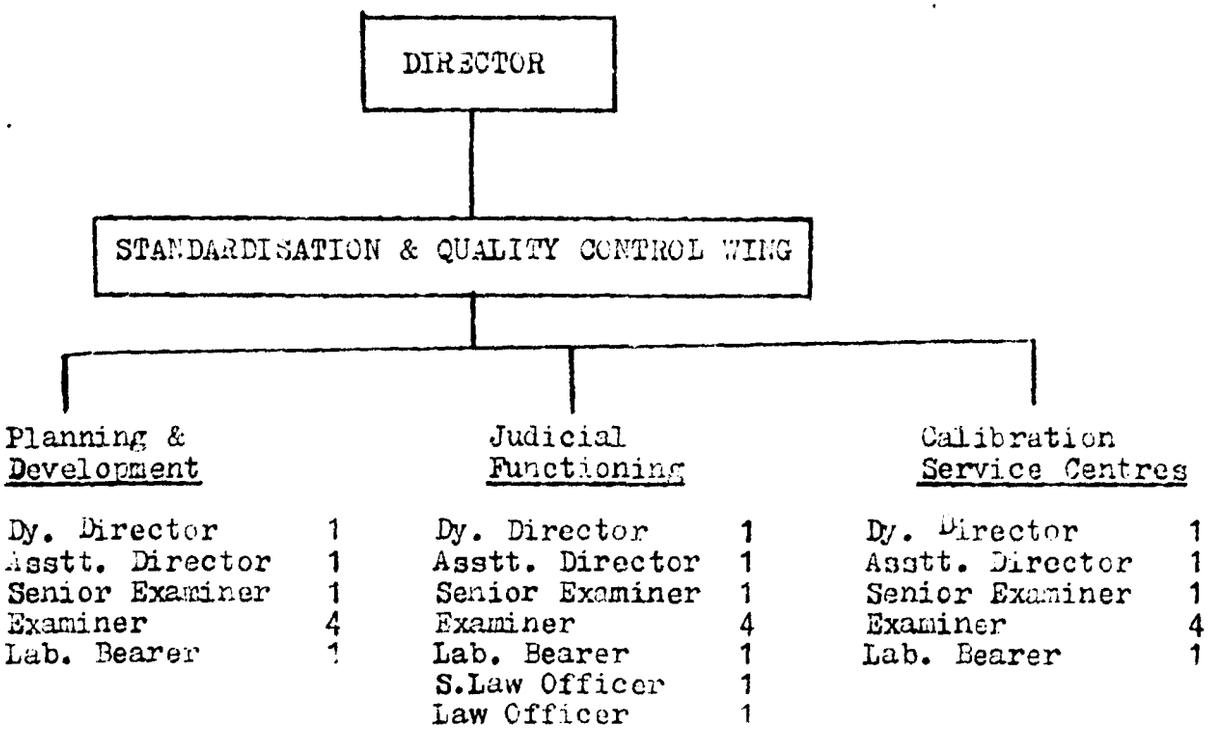
ANNEXURE XII

(c)

PROPOSED
ORGANISATION CHART OF
CENTRAL TESTING LABORATORIES
KARACHI/LAHORE



ANNEXURE XII
(d)

PROPOSED ORGANISATION CHART OF CENTRAL TESTING LABORATORIES KARACHI/LAHORE

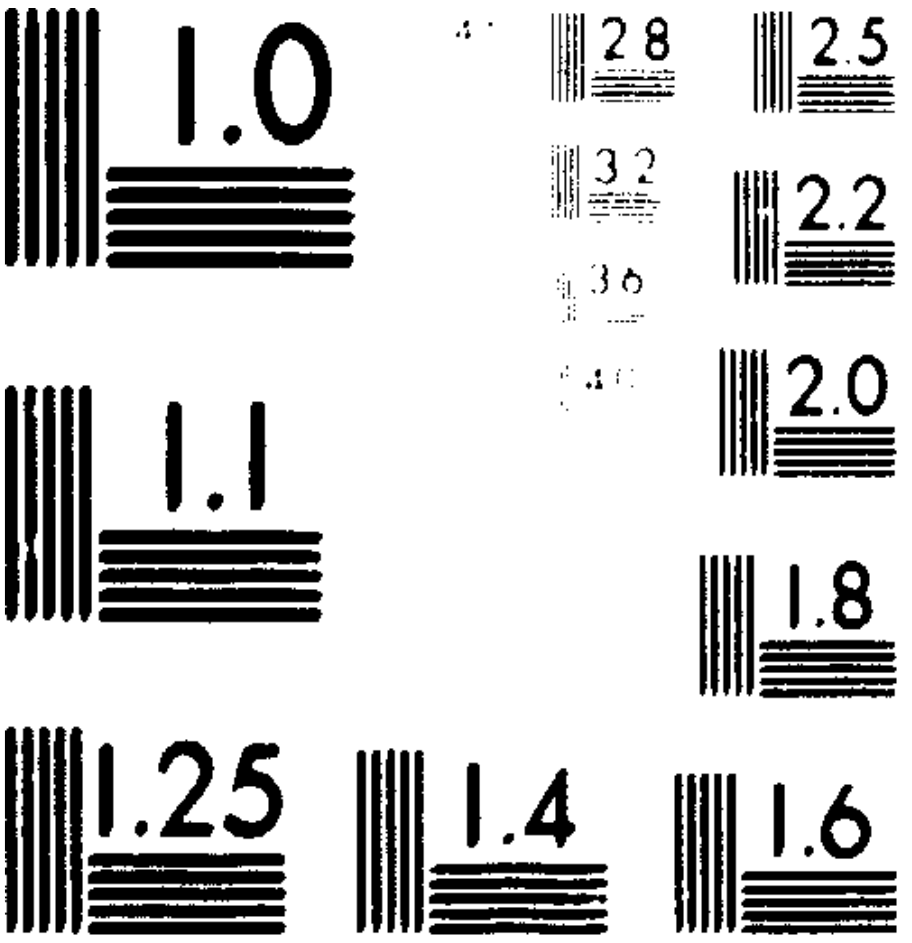
DIRECTOR

ADMINISTRATIVE DIVISION

Asstt. Director (Admn)	1
Store Officer	1
Superintendent	3
Librarian	1
Stenographer	4
Cashier	1
Store Keeper	2
U.D.C.	11
L.D.C.	9
Senior Clerk	1
Typist	2
Daftary	12
Farash	4
Chowkidar	2
Mali	1
Sweeper	4

DIFFERENT PHASES FOR IMPLEMENTATION

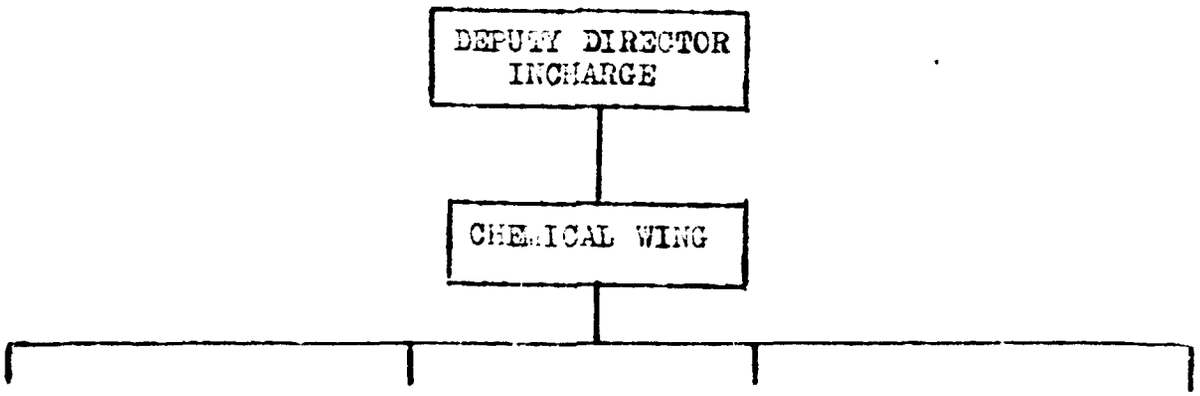
CHEMICAL	PHYSICAL	PROJECT STANDARDISATION AND QUALITY CONTROL
INORGANIC & ORGANIC SECTION	Building Material Textile, Mechanical, Electrical Workshop	Work on Atomic Absorption Spectrometer
Food & Farm Section	Electric	Acquisition/working on Jarrell Ash Spectrograph
Instrumental Analysis Section.	Quality Control	



ANNEXURE XIII

(a)

PROPOSED ORGANISATION CHART OF CENTRAL TESTING LABORATORIES QUETTA/PESHAWAR

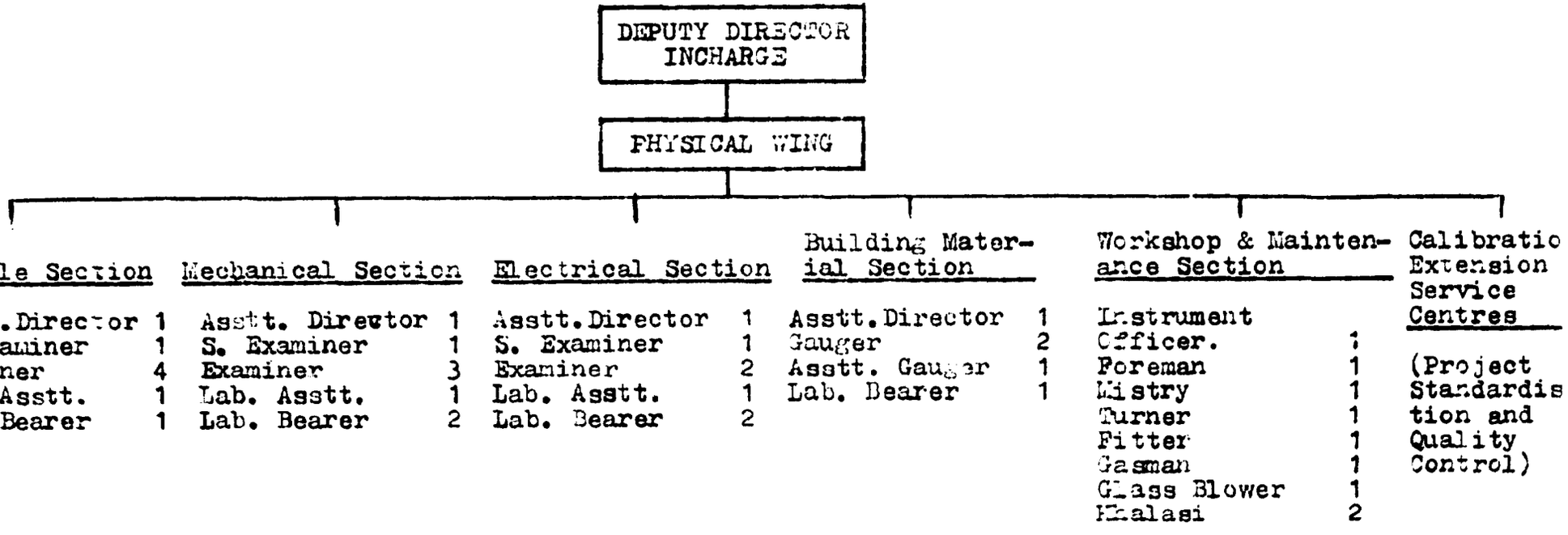


Inorganic Section		Organic Section		Instrumental Analysis Section		FOOD & FARM Section	
Asstt. Director	1	Asstt. Director	1	Asstt. Director	1	Asstt. Director	1
S. Examiner	1	S. Examiner	1	S. Examiner	1	S. Examiner	1
Examiner	4	Examiner	3	Examiner	4	Examiner	4
Lab. Asstt.	1	Lab. Asstt.	1	Lab. Asstt.	1	Lab. Asstt.	1
Lab. Bearer	2	Lab. Bearer	1	Lab. Bearer	1	Lab. Bearer	1

ANNEXURE XIII

(b)

PROPOSED ORGANISATION CHART OF CENTRAL TESTING LABORATORIES QUETTA/PESHAWAR



ANNEXURE XIII

(c)

PROPOSED ORGANISATION CHART OF CENTRAL TESTING LABORATORIES QUETTA/PESHAWAR

DEPUTY DIRECTOR INCHARGE

Adm./Accounts/Store/Sample and Library Section

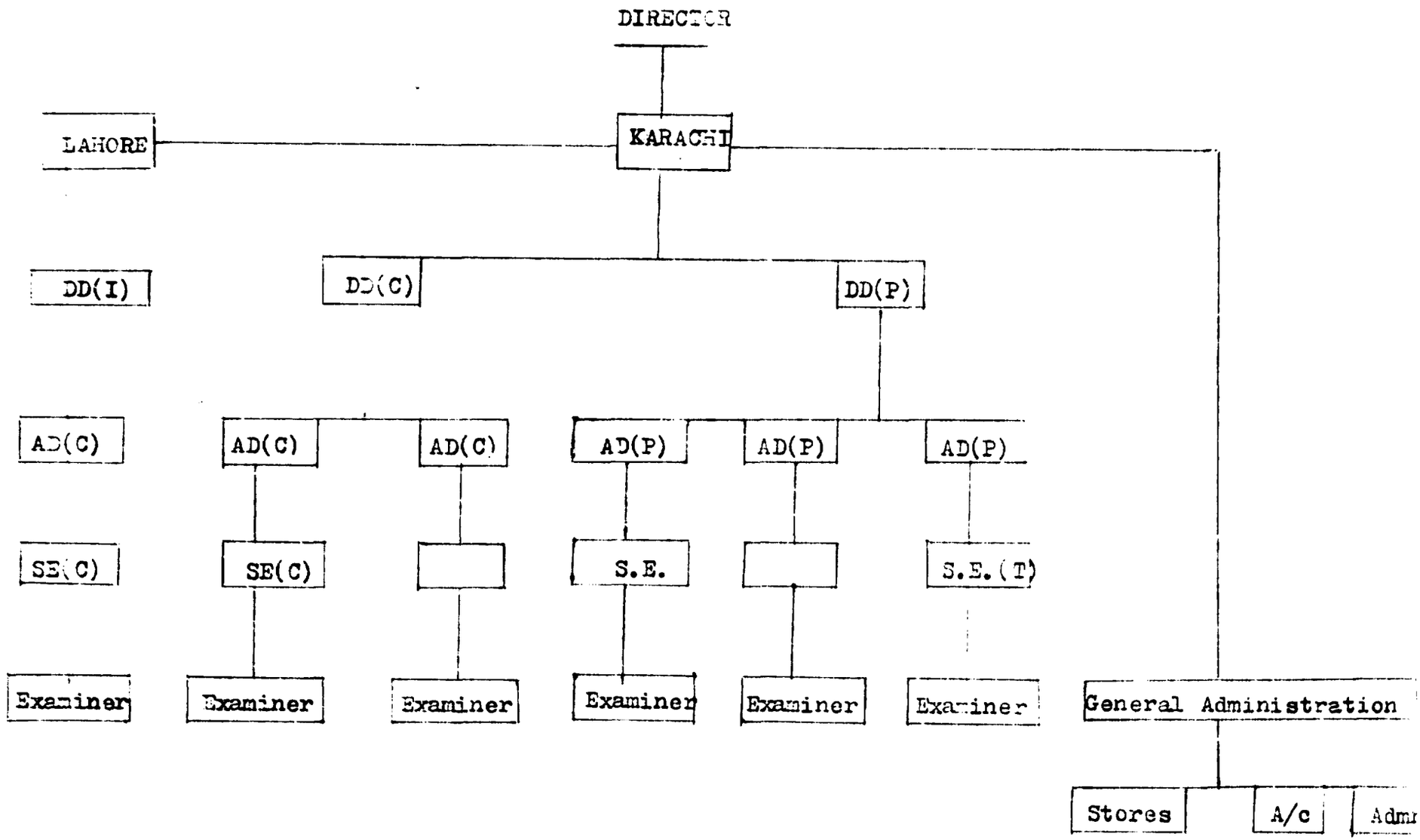
Administrative Officer	1
Superintendent	3
Stenotypist	4
Librarian	1
U.D.C.	6
L.D.C.	9
Store-Keeper	1
Peon	8
Chowkidar	3
Mali	1
Sweeper	4

DIFFERENT PHASES FOR IMPLEMENTATION

	Chemical Wing	Physical Wing
I.	Inorganic, Organic Section	Building Material, Mechanical & Workshop
II.	Food & Farm Section	Textile
III.	Instrumental Analysis Section	Electrical Section
IV.	Calibration Services (Project Standardisation & Quality Control)	

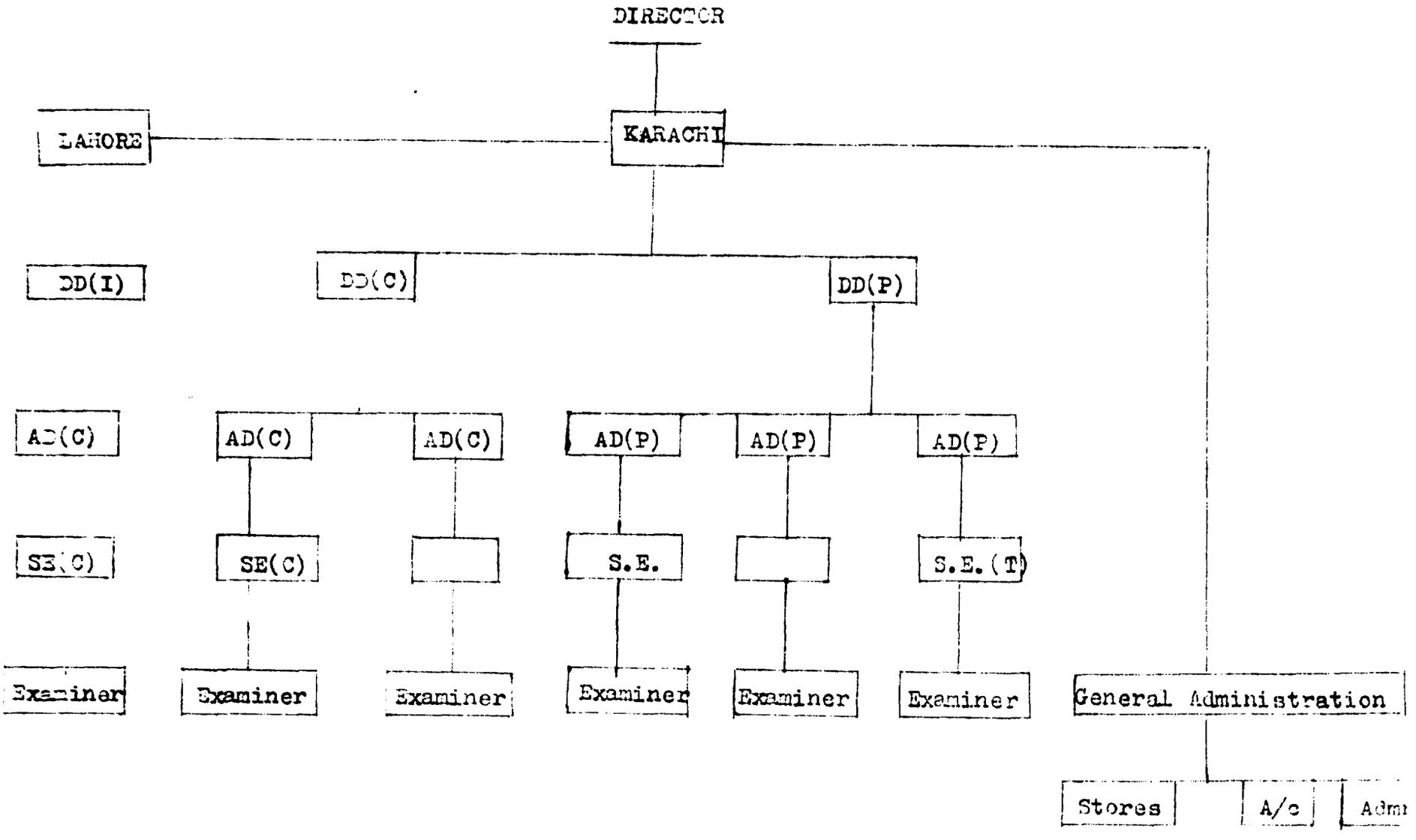
ANNEXURE XIV

POSITION CHART OF CENTRAL TESTING LABORATORIES KARACHI/LAHORE



ANNEXURE XIV

POSITION CHART OF CENTRAL TESTING LABORATORIES KARACHI/LAHORE



ANNEXURE XVI

CENTRAL TESTING LABORATORIES

Statement showing No. of samples tested and the revenue earned year-wise from July, 1975 to March 1981, Central Testing Laboratories Karachi

Sl. No.	Years		Chemical	Building Material Cement	Physical	Testile	Total
1.	1975-76	Samples	1339	395	1892	2931	6557
		Revenue	94950	4038	44289	54417	197694
2.	1976-77	Samples	939	1225	1840	3107	7111
		Revenue	63837	9419	38054	49802	161112
3.	1977-78	Samples	1128	823	794	4925	7670
		Revenue	134495	12142	76716	109188	332541
4.	1978-79	Samples	948	286	449	4350	6033
		Revenue	124592	16840	35165	127573	304170
5.	1979-80	Samples	1309	306	654	533	2802
		Revenue	72713	14760	68338	24870	280681
6.	1980 to March'81	Samples	1059	124	1112	354	2648
		Revenue	117765	4675	78047	19180	219667

ANNEXURE XVII

CENTRAL TESTING LABORATORIES, LAHORE
Samples and Revenue July 1975 - March 1981.

Years		CHEMICAL	CEMENT	PHYSICAL	TEXTILE	TOTAL
1		2	3	4	5	6
1975-76	SAMPLES	687	3294	2645	780	7406
	REVENUE	Rs. 42,198.30	Rs. 19,717.00	Rs. 46,888.00	Rs. 17,396.00	Rs. 1,26,199.30
1976-77	SAMPLES	706	3423	4980	593	9702
	REVENUE	Rs. 47,825.00	Rs. 24,049.00	Rs. 99,029.00	Rs. 14,966.00	Rs. 1,85,869.00
1977-78	SAMPLES	584	5023	2730	677	9014
	REVENUE	Rs. 44,705	Rs. 30,310.00	Rs. 69,679.00	Rs. 15,819.00	Rs. 1,68,513.00
1978-79	SAMPLES	729	6299	4727	1379	13134
	REVENUE	Rs. 71,142.00	Rs. 33,969.00	Rs. 1,29,015.00	Rs. 22,512.00	Rs. 3,06,628.00
1979-80	SAMPLES	496	8399	3363	1156	13414
	REVENUE	Rs. 44,341.00	Rs. 1,62,462.00	Rs. 1,12,859.00	Rs. 37,070.00	Rs. 3,56,732.00
1980-81 (Upto 31.3.81)	SAMPLES	461	5327	2152	491	8281
	REVENUE	Rs. 46,390.00	Rs. 1,34,170.00	Rs. 85,685.00	Rs. 14,200.00	Rs. 2,80,945.00

ANNEXURE XVIII

Statement showing No. of samples from July, 1977 to May, 1981.

Years	Govt.* Dept.	Semi-* Govt.	Private	Foreign Mission	Total
July, 1977 to June, 1978.	5429	796	1435	-	7670
July, 1978 to June, 1979.	4852	477	714	-	6043
July, 1979 to June, 1980.	736	1153	913	-	2802
July, 1980 to May, 1981.	851	1395	936	-	3182
	11868	3821	3998	-	12103

*

1. Department of Supplies.
2. Pakistan Standards Institution.
3. Excise and Customs.
4. Pakistan Steel Mills Corporation.
5. Department of Industries Sind Government.
6. Inspection Department Vehicles and Electronics.
7. Telegraph and Telecommunication.
8. Government Hospital.
9. Pak. Public Works Dept.
10. Export Promotion Bureau.
11. Trading Corporation of Pakistan.
12. Coal Controller.
13. F.I.A.
14. Police & Courts.
15. D.G.Food and Civil Supplies.
16. P. I. A.
17. Railways
18. Karachi Development Authority.
19. Pakistan Industrial Corporation.
20. W.A.P.D.A.
21. Provincial Government.
22. Rice Export Corporation, etc.

Annexure XIX (a)

SUMMARY OF ACTUAL TIME TAKEN BY GROUP/SECTIONWISE

ITEM - PAINT SPECIFICATION NO.

S.No.	Group/Section	Man Hrs Hr.	Min.	Non Man Hrs Hrs.	Min.	Total Hrs.	Min.	REMARKS
1.	C.F.S.	-	24	-	-	-	24	
2.	Sample Control	-	17	-	-	-	17	
3.	Office Chemical Lab.	-	13	-	-	-	13	FINING One working day-6 Man Hrs. 24 Non Man Hrs. - 1 working day.
4.	Chemical Lab.							
	a. With weathrometer	2	33	*1474	-	1476	33	*12 Non man hours in this case with comprise of 7 working days.
	b. Without weathrometer.	2	33	720	-	722	33	MAN POWER The sample is tested and checked by one officer, one Incharge and one worker in each Group.
5.	Office Chemical Lab.	-	44	-	-	-	44	
6.	Sample Control	-	57	-	-	-	57	
	Total Time							
	With weathrometer	5	9	1474	-	1479		
	Without weathrometer	5	9	720	-	725	9	

Total No. of working days.	Man Hrs. Day	Hr.	Min.	Non Man Hrs. Day	Hr.	Min.	Total Day	Hr.	Min.	
a. With weathrometer	-	5		60	-	-	60	5	9	- 61 Hrs
b. Without weathrometer	-	5	9	30	-	-	30	5	9	- 31 Hrs

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Annexure XIX(a) (contd)

ITEM: PAINT FINISHING CS GLASS PFU BSC 223

Nature of Sample - ADVANCE

Specification No.

S.No.	JOB DETAILS	TIME TAKEN	REMARKS
	GROUP: CENTRAL TRANSIT SECTION		
1.	Receipt of Samples from Railway Station and registration of the package.	4 Min.	
2.	Delivery to sample control transit	20 Min.	
	Total Time:	24 Min (M.H)	
	GROUP : SAMPLE CONTROL		
3.	Checking of package, seals, marking and RR/PWS/PR details.	1 Min.	
4.	Registration of the sample details written outside package.	2 Min.	
5.	Opening of the package	2½ Min.	
6.	Checking of the inner contents	1 Min.	
7.	Writing of the details not covered at 4 above.	1½ Min.	
8.	Issue of sample to group concerned and registration in sample register.	2 Min.	
9.	Preparation of the sample and sealing of the label.	2 Min.	
10.	Delivery of the sample to Chemical Lab.	5 Min	
	Total Time - -	17 Min (M.H).	
	GROUP : OFFICE CHEMICAL LAB		
1.	Receipt of the sample from Sample Control, checking of contents, label, seals and classification.	2 Min.	
2.	Tracing of the contract case	2 Min.	
3.	Filing of the Forwarding Note in the contract case.	1 Min.	
4.	Registration of the sample in the sample register.	2 Min.	
5.	Filing of the sample control proforma in Sample Control.	1 Min.	
6.	Delivery of the sample to Paint Sec. for tests.	5 Min	
	Total Time	1.13 Min (M.H)	

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Annexure XIX (a) (contd)

1. Preliminaries		
a. Receipt of sample-- checking of seals,labels,registration.	3 Min.	
b. Tracing and studying of the specification.	15 Min.	
c. Opening/unsealing of the sample container	10 Min.	
d. Stirring of the paint inside the container.	15 Min.	
e. Cleaning of the Brush including the time 2 min in oven	8 Min.	
f. Cleaning and drying of the panel	4 Min.	Time: 55 Min. M.H.
2. Application Test		
a. Writing of Date,time and Sample No. on 4 panels.	4 Min.	
b. Application by Brush	10 Min.	
c. Drying at room temperature	24 Hrs.	(N.M.H)
3. Weight per Imperial Gallon	12 Min.	Time: M.H. 26 Min N.M.H. 24 Hrs. 24 Hrs.26 Min.
4. % of Pigment		
a. Cleaning of the Tube	5 Min.	
b. Drying	10 Min	No man hour
c. Cooling of the Tube	10 Min.	
d. Weight of Tube	3 Min.	
e. Weighing with Paint	3 Min.	
f. Stirring with thinner 3 times	6 Min.	
g. Certifying of the paint 3 times	36 Min.	30 Min.No man hr. required.
h. Evaporation of the thinner from the pigments by keepingin oven	1 hour	No man hour
j. Cooling of the tube	10 Min.	
k. Weighing	3 Min.	
l. Calculation	3 Min.	Time M.H. 39 Min. N.M.H. 1 Hrs.50 Min. 2 Hrs. 29 Min.
5. Hard Drying Test		
a. Setting of the panel on apparatus	2 Min.	
b. Testing on Machine	2 Min.	Time 4 Min (M.H)

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Annexure XIX (a) (contd)

6. Scratch Test

a. Setting of the panel on apparatus	2 Min.
b. Testing on machine, 3 readings	3 Min. Time:5 Min(M.H)

7. Bend Test

a. Keeping of the panel in the Mandrel	1 Min.
b. Bending of the Panel - 2 readings	2 Min. Total 3 Min.

8. Accelerated Weathering Test

a. Application on panel and keeping at room temperature	168 hrs. MH
b. Keeping in the weathermeter	
1. In weathermeter : 1000 hrs (MH)	
2. One hr. rest in working hr. after every 24 hrs(7 working days): 42 hrs (MH)	1306 MH
3. Non Functioning of weathermeter from 2 P.M. on Saturday till 730 A.M. on Monday : 44 x 6 OR	264 (MH)
c. Keeping the panel outside the room for weathering Test	720 MH

9. Salt Spray

a. Application	168 hrs.
b. Actual spray	240 hrs.

10.	Preparation of draft test report	15 Min.
11.	Checking of the report by I/C Section	5 Min.

ITEM: PAINT GROUP : CHEMICAL LAB.

1. Preliminaries

a. Receipt of the sample from Paints Sec - Checking, registration in the Note Book.	2 Min.
b. Tracing of the specification	4 Min.
c. Studying of the specific tion	10 Min. Total 16 Min.

2. % of Alkyd Resin

a. Preparation of apparatus for use in the test, cleaning	20 Min.
b. Drying	30 Min. MH
c. Weighing of the sample	5 Min.
d. Preparation of reagent for digesting the sample	10 Min,

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Annexure XIX (n)..(contd.)

e.	Keeping of the Flask on the water tank	2 hours N.H	
f.	Transferring of the entire mass to another cleaned flask.	2 Min.	
g.	Titration of the solution	25 Min.	M.H.Full time attention.
h.	Calculation of Alkyd Resin %	10 Min.	Total: 75 Min. M.H.
3.	% of Drying oil in the Vehicle	3 Min.	
	By difference calculated from % of Alkyd Resin (1-15)		
4.	Preparation of Test Report	5 Min.(2-30) 150Min.M.H	
5.	Checking of the report by I/C Section	3 Min.	
6.	Preparation of the draft report based on the results of Paint Physical and Chemical Sec.	15 Min.	
7.	Perusal of the draft report by O.I/C Lab.	2 Min.	

GROUP : CHEMICAL LAB OFFICE

1.	Typing of the report	15 Min.
2.	Signing of the report by O.I/C Lab.	5 Min.
3.	Registration of the sample and the Test Report.	4 Min.
4.	Delivery of the Test report to CR for despatch	10 Min.
5.	Delivery of the unexpended sample to sample control.	10 Min.
	Total Time:	44 Min.(M.H)

GROUP: SAMPLE CONTROL

1.	Receipt of the sample - checking of Lab. No.	2 Min.
2.	Registration in the Receipt Group Register	4 Min.
3.	Preparation of Forwarding Note (3 copies)	4 Min.
4.	Preparation packing Note (3 copies)	3 Min.
5.	Checking of the sample with packing Note	2 Min.
6.	Signature of G.O. on Packing and Forwarding Notes.	5 Min.
7.	Packing of the sample	20 Min.
8.	Registration in the despatch Register	3 Min.
9.	Delivery of the sample to CTS for onward despatch to the consignee	15 Min
	Total Time	: 58 Min.(T.H)

Annexure XIX (a)...(contd)

SUMMARY OF
TIME AND MOTION STUDY

Item: **PAINT FINISHING** Nature of sample : Advance
Specification No.

S.No.	Group/Section	Operation/Process.	Operation/Process.	TIME TAKEN Man Hrs Hr.	Min.	Non Man Hrs Hr.	Min.	TOTAL Hr.	Min.	Remarks
1.	C.T.S.	1	Receipt, checking and registration of sample	-	4	-	-	-	4	
		2	Issue to sample control	-	20	-	-	-	20	
			Total	-	24	-	-	-	24	
2.	Sample Control	1	Checking opening and registration of the sample.	-	8	-	-	-	8	
		2	Issue to Group concerned sealing and preparation of labels.	-	9	-	-	-	9	
			Total	-	17	-	-	-	17	
3.	Office Chemical Lab.	1	Receipt of sample, checking, tracing of case, filling of the Fwd/Note registration, delivery to paint Sec. in Chem. Lab.	-	13	-	-	-	13	
			Total	-	13	-	-	-	13	
4.	Chemical Lab. (a) 'Paint Sec'	1	Receipt of sample, checking and registration, tracing and studying of specification.	-	18	-	-	-	18	
		2.	Opening of the sample, cleaning the brush and stirring it.	-	37	-	-	-	37	
		3.	Application Test	-	26	24	-	24	26	

Annexure XIX (a)..(contd)

(Continued Item - Paint)

S.No.	Group/Section.	Operation/ Process.	Operation/Process.	TIME TAKEN Man Hrs. Hr.	Min.	Non Man Hrs. Hr.	Min.	TOTAL Hr.	Min.	Remarks
4.	Chemical Lab. (Contd)	4	% of Pigment	-	39	1	50	2	29	
		5	Hard Drying Test	-	4	-	-	-	4	
		6	Scratch Test	-	5	-	-	-	5	
		7	Bend Test	-	3	-	-	-	3	
		8	Accelerated Weathering Test.	-	-	*1474	-	1476	33	*42 Non man hr in this case will comprise of 7 working days.
			a. With weathrometer	-	-	*1474	-	1476	33	
			b. Without weathrometer	-	-	720	-	722	33	
		9	Salt Spray	-	-	408	-	408	-	
		10.	Preparation of report and checking by I/C section.	-	-	21	-	-	21	
			Total With weathrometer	2	33	1907	50	1910	23	
			Without weathrometer	2	33	1153	50	1156	23	
			Man hours & Non man hours counted for tests							
			a. with weathrometer	2	33	1174	-	1476	33	
			b. without weathrometer	2	33	720	-	722	33	

Annexure XIX (a)..(contd)
(continued Item Paint)

S.No.	Group/Section	Operation/ Process.	Operation/Process.	Time Taken Man Hrs. Hrs.	Min	Non Man Hrs Hr.	Min.	Total Hr.	Min.	Remarks
	b. Chemical Lab.	1	Receipt of sample, registration, grading and studying of specification.	-	16	-	-	-	16	
		2	Alkeyed Resin Test	1	15	2	30	3	45	
		3.	Preparation of report and checking by I/c Section	-	28	-	-	-	28	
			Total	1	59	2	30	4	28	
			Total man hr and non man hr counted for tests in Chemical Lab. Pain & Chemical Section.							
			a. with weathrometer	2	33	1474	-	1474	33	
			b. without weathrometer	2	33	720	-	722	33	

ANNEXURE XIX (b).

SUMMARY OF ACTUAL TIME TAKEN BY GROUP/SECTION

Item: SOAP (WASHING) SPECIFICATION:

S.No.	GROUP/SECTION	Man Hrs Hr.	Man Hrs Min.	Non Man Hrs. Hr.	Non Man Hrs. Min.	Total Hr.	Total Min.
1.	C.T.S.	-	24	-	-	-	24
2.	Sample Control	-	17	-	-	-	17
3.	Chemical Lab.(Office)	-	13	-	-	-	13
4.	Chemical Lab.	18	49	5	35	24	24
5.	Chemical Lab.(Office)	-	49	-	-	-	49
6.	Sample Control	-	57	-	-	-	57
		21	29	5	35	27	4

Man Power
The sample is tested and checked by one officer, one Incharge and one Worker in each Group/Section.

Note:-
One working day = 6 Man Hrs.
24 Man Man Hrs = 1 working day.

	Man Hrs. Days:	Hr.	Min	Non Man Hrs. Days:	Hr.	Min.	Total Days:	Hr.	Min.	
Total No. of working days.	3	3	29	-	5	35	4	3	4	= 4.5 days.

Annexure XIX (b) (contd)

ITEM - SOAP WASHING Nature of Sample : Advance

Specification No.

S.No.	Job details.	Time Taken	Remarks
	Group :	Central Transit Section	
1.	Receipt of Sample from Railway Station and Registration of the package.	4 Min.	
2.	Delivery to Sample Control	20 Min	
	Total	24 Min.	
	Group :	Sample Control	
3.	Checking of package, scale marking and RR/PWS/PR dot In.	1 Min.	
4.	Registration of the Sample details written outside the package.	2 Min.	
5.	Opening of the package	2-1/2 Min.	
6.	Checking of the inner contents	1 Min.	
7.	Writing of details not covered at 4 above.	1-1/2 Min.	
8.	Issue of Sample to group concerned and registration in sample Register.	2 Min.	
9.	Preparation of Sample and Sealing of the label.	2 Min.	
10.	Delivery to chemical lab.	5 Min	
	Total	17 Min	
	Group:	Chemical Lab. Office	
1.	Receipt of Sample from sample control, checking of contents, label, seals and classification.	2 Min.	
2.	Tracing of the Contract base	2 Min.	
3.	Filing of the Forwarding Note in the Contract Case	1 Min.	
4.	Registration of the Sample in the Sample Register	2 Min.	
5.	Filing of the Sample Control Proforma in sample Control register.	1 Min.	
6.	Delivery of the Sample to Chemical Section for test.	5 Min.	
	Group :	Chemical Lab.	
1.	Preliminaries		
	a. Checking and registration of the sample	5 Min.	
	b. Tracing and study of the specification	15 Min.	
	c. Writing the different tests on the Lab. Note Book	5 Min.	
		Time: 25 Min.	

Annexure XIX(b)(contd)

1. Moisture %

I. Washing and drying of the Dishes	5 Min	23 Min	30 Min
II. Cooling in desietor	5 Min	23 Min	30 Min
III. Weighing of the sample	5 Min	-	5 Min
IV. Heating at a specified temperature for a specified period	15 Min	4 hrs 45 min	5 hrs
V. Calculations	5 Min	-	5 Min
Time:	35	5.35	6.10

2. Weight of Soap per Bar

a. Calculations	10 Min
b. Checking	5 Min
Time	15 Min.

3. Fatty Acids

a. Washing & Drying of bookers	5 Min	25 Min	30 Min
b. Cooling indesicator	5 Min	20 Min	25 Min
c. Weighing of bookers	5 Min		
d. Weighing of sample	5 Min		
e. Heating of sample in water	20 Min		
f. Brakeing of fatty Acids with sulphuric acid.	10 Min		
g. Heating (Boiling)	10 Min		
h. Filteration of Fatty Acids	45 Min		
i. Drying the fatty acid	10 Min	50	60
j. Weighing	5 Min		
k. Calculations	5 Min		
	M.H. 2 hrs 5 Min		
Time :	N. M.H. 1 hr 35 Min		
	3 hrs 40 Min.		

4. Rosin Acids

a. Detection of Rosin Acids	5 Min	
b. Estimation of Rosin Acids	90 Min	4 hrs
Time:	M.H: 1 hr 35 Min N.M.H: 4 hrs -	
	5 hrs 35 Min.	

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Annexure XIX(b).(contd)

5. Neutralization Number

a. Washing & drying of flash and bakers	10 Min	20 Min	30 Min.
b. Weighing of sample	5 Min		
c. Titration	15 Min		
d. Calculations	5 Min		
e. Checking	5 Min		
M.H.	40 Min		
Time N.M.H.	20 Min		
	1 hr.		

6. Iodine Number

a. Washing & drying of flash and bakers	30 Min
b. Weighing	5 Min
c. Adding C.T.S. and wij's solutions	7 Min
d. Preparation of wij's solution	2 hrs
e. Treating with wij's solution	30 Min
f. Preparation & standardization of this solution.	2 hrs.
g. Titration	5 Min
h. Calculation	5 Min.
i. Checking	5 Min.
Time:	5 hrs 27 Min (MH)

7. I.N.S. Factor

(Neutralization - Iodine)	2 Min
Time:	2 Min

8. Matter Insoluble Alcohol

a. Washing of beakers	5 Min		
b. Weighing	5 Min		
c. Weighing of W.Bottles	5 Min		
d. Drying W.Bottles	5 Min	25 Min	30 Min
e. Cooling "	5 Min	15 Min	20 Min
f. Weighing "	5 Min.		
g. Heating Sample in Alcohol	50 Min		
h. Filteration and washing	40 Min.		
i. Drying	5 Min	55 Min	60 Min
j. Cooling	5 Min	15 Min	20 Min.
k. Weighing	5 Min.		
l. Calculation & checking	10 Min.		
Time.	MH 2 hrs 25 Min		
	NMH 1 hr 50 Min.		
	4 hrs 5 Min.		

Annexure XIX (b) .(contd)

9. **Total free Alkali**

a. Washing & Drying of flack	5 Min	25 Min	30 Min
b. Weighing	5 Min		
c. Heating of Sample	20 Min		
d. Titration	30 Min		
e. Calculation & Checking	10 Min		

Time M.H. 1 hr 10 Min
N.M.H. 25 Min
1 hr 35 min.

10. **Caustic free Alkali**

a. Washing & Drying of flack	5 Min	25 Min	30 Min
b. Weighing	5 Min		
c. Treating the sample with barium sulphate	5 Min		
d. Decantation & Titration	40 Min		
e. Calculation & Checking	10 Min		

Time: M.H. 1 hr 5 Min
N.M.H. 25 Min
1 hr 30 Min.

11. **Ether Solubles**

a. Washing & drying of Sonlet bulb	5 Min	25 Min	30 Min
b. Cooling	5 Min	25	30 Min
c. Weighing	5 Min		
d. Extraction	1 hr	5 Min	6 Hrs
e. Washing & drying of the beaker	5 Min	25 Min	30 Min.
f. Cooling and weighing	5 Min	25 Min	30 Min
g. Washing with water	35 Min.		
h. Drying	5 Min	25 Min	30 Min.
i. Cooling & weighing	5 Min	25 Min	30 Min
j. Calculation & checking	10 Min		

Time M.H. 2 hr. 20 Min.
N.M.H. 2 hr 35 Min
4 hr 55 Min.

12. **Sampling**

a. Washing & drawing sampling bottles	5 Min	25 Min	30 Min.
b. Sampling of one bear only.	20 Min.		

Time M.H. 25 Min.
N.M.H. 25 Min
50 Min.

Annexure XIX (b) (contd)

Preparation of report	10 Min.
Checking of report by I/C Sec.	5 Min.
Perusal of report by O.i/c Lab.	5 Min.
Time	20 Min

Group: Chemical Lab.Office

1. Typing of the report	15 Min
2. Checking of the report by I/C Sec.	5 Min
3. Signing of the report by O.i/c Lab.	5 Min.
4. Registration of the sample and test report	4 Min.
5. Delivery of the test report to C.R. for despatch	10 Min.
6. Delivery f the unexpended sample to sample control.	10 Min
Total	49 Min.

Group : Sample Control

1. Receipt of the sample checking of Lab No.	2 Min.
2. Registration in the receipt Group register	4 Min.
3. Preparation of Forwarding Note c 3 copies	4 Min.
4. Preparation of Packing Note (3 copies)	3 Min
5. Checking of the sample with Packing Note.	2 Min.
6. Signature of C.O. on Packing Note and Forwarding Note	5 Min.
7. Packing of the sample	20 Min.
8. Registration in Despatch Register	2 Min.
9. Delivery of the sample to C.T.S.for onward despatch to the consignee	15 Min
Total	57 Min

ANNEXURE XIX (b)

SUMMARY OF TIME AND MOTION STUDY

Item : SOAP WASHING SPECIFICATION

NATURE OF SAMPLE: ADVANCE

S.No.	GROUP/SECTION	OPERATION/ PROCESS No.	OPERATION/PROCESS	TIME TAKEN Man Hrs Hr.:Min	Non Man Hrs. Hr.	Min	TOTAL Hr.	Min.	REMARKS
1.	C.T.S.	1	Receipt, checking and registration of samples	- 4	-	-	-	4	
		2	Issue to sample control	- 20	-	-	-	20	
			Total	- 24	-	-	-	24	
2.	Sample Control	1	Checking, opening and registration of sample	- 8	-	-	-	8	
		2	Issue to chemical lab office, sealing and preparation of label.	- 9	-	-	-	9	
			Total	- 17	-	-	-	17	
3.	Chemical Lab (office)	I	Receipt of sample from sample control, tracing of the contract case.	- 4	-	-	-	4	
		2	Filing of the fwd/Note, registration & delivery of the sample to chemical lab for test.	- 9	-	-	-	9	
			Total	- 13	-	-	-	13	

contd.....

Annexure XIX (b) (contd)

1	2	3	4	5	6	7	8	9	10	11
4.	Chemical Lab.	1	Checking and registration of sample tracing & studying of specification writing the different tests on the Lab. Note Book.	-	25	-	-		25	
		2	Moisture %	-	35	5	35	6	10	
		3.	Weight of soap per bar	-	15	-	-	-	15	
		4.	Fatty acids	2	5	1	35	3	40	
		5.	Resin Acids	1	35	4	-	5	35	
		6.	Neutralisation Number	1	40	-	20	1	-	
		7.	Iodine Number	5	27	-	-	5	27	
		8.	I.H.S. Factor	-	2	-	-	-	2	
		9.	Matter insoluble alcohol	2	25	1	50	4	15	
		10.	Total free alkali	1	5	-	25	1	30	
		11.	Caustic free alkali	1	5	-	25	1	30	
		12.	Other solubles	2	20	2	35	4	55	
		13.	Sampling	-	25	-	25	-	50	
		14.	Preparation of report, checking of report by I/c, Sec. Perus 1 of report by I/c. Lab.	-	20	-	-	-	20	
			Total	18	49	17	10	35	59	
			Actual Man Hr. & Non Man Hr counted for test	18	49	5	35	24	24	
5.	Chemical Lab(office	1	Typing of report, checking of the report by I/c, Sec. and signing on the report by O.i/c of the Lab.	-	25	-	-	-	25	
		2	Registration of the sample and test report delivery of the test report to C.R. and then to sample control	-	24	-	-	-	24	
			Total	-	49	-	-	-	49	

Annexure XIX (b) (con

6.	Sample Control	1	Receipt of sample, checking of Lab. No. registration preparation of fwd/ Note, signing by C.O. on packing and fwd/Note.	-	19	-	-	-	19
		2	Packing of sample, registration and delivery to C.T.S. for onward despatch to consignee.	-	38	-	-	-	38
			Total	-	57	-	-	-	57
			Grand Total	21	29	17	10	38	39
			Total Man.Hr. and Non Man Hr. counted for test	21	29	5	35	27	4

ANNEXURE XX (a)

LABORATORY TEST REPORTS PROFORMA

Test Report No.

(FINISHING PAINTS)

Wing_____

Lab_____

(For internal use in Lab only)

Nomenclature:
Forwarding Note:
Specn/Drg/Tech Data:

Sample (s) No :
Type of Sample (s) :
Date Sample (s) Recd :
Date Sample (s) reported:

PART - I

S.No.	Nature of TESTS	Actual Test Results				Specified Requirements.
		Sample No.	Sample No.	Sample No.	Sample No.	
1.	DESCRIPTION					
2.	CONDITION IN CAN					
3.	CONSISTENCY					
4.	APPLICATION					
5.	COLOUR					
6.	FINISH					
7.	DRYING TIME					
	a. Surface druing time					
	b. Hard drying time (Stoving/baking temp)					
8.	FLEXIBILITY + ADHESION (BE TEST)					
9.	SCRATCH TEST					
10.	IMPACT TEST					
11.	RESISTANCE TO SALT SPRAY					
12.	RESISTANCE TO CORROSION					

Annexure XX (a)(contd)

S.No.	Nature of Tests	Actual Test Results Sample No.	Sample No.	Sample No.	Sample No.	Specified Requirements.	Tested by (Name with Sig.)
13.	RESISTANCE TO WHITE SPIRIT						
14.	RESISTANCE TO MINERAL OIL						
15.	RESISTANCE TO GASOLINE						
16.	WEIGHT PER IMPERIAL GALLON						
17.	LEAD RESTRICTION TEST (ACID SOLUBLE LEAD AS Pbo)						
18.	WEATHERING TEST						
19.	CHEMICAL TESTS						
20	OTHER TESTS						
21.							

Contd.....

Annexure XX (a) (contd)

PART-II

TESTED
a. Name_____
b. Initial_____
c. Time & Date_____

CHECKED BY
a. Name_____
b. Initial_____
c. Time & Date_____

PART - III

DETAILS OF TESTS CARRIED OUT BY GO.LAB

S.No.	Nature of Tests	Results	Specified Requirements

Time:_____
Date:_____

Inspector
Name _____
Desig _____

PART-IV

DETAILS OF TESTS CARRIED OUT BY OIC LAB

S.No.	Nature of Tests	Results	Specified Requirements

Time:_____
Date _____

Senior Inspector/Asstt.Director
Name_____
Desig _____

Annexure XX (a) (contd)

LABORATORY TEST REPORT PROFORMA

(FINISHING PAINTS)

(For External Use)

Wing_____ Test Report No._____

Lab:_____ Copy No._____

Nomenclature: Sample(a) No:

Forwarding Note: Type of Sample (s):

Speen/Drg/Tech Data: Date Sample (s) recd:

Date Sample(s) reported:

S.No.	Nature of Tests	Actual Test Results				Specified Requirements	Tested by (Name with Sig)
		Sample No.	Sample No.	Sample No.	Sample No.		
1.	DESCRIPTION						
2.	CONDITION IN CAN						
3.	CONSISTENCY						
4.	APPLICATION						
5.	COLOUR						
6.	FINISH						
7.	DRYING TIME:						
	a. Surface drying time						
	b. Hard drying time (Stoving/baking temp)						
8.	FLEXIBILITY + ADHESION (BEND TEST)						
9.	SCRATCH TEST						
10.	IMPACT TEST						
11.	RESISTANCE TO SALT SPRAY						
12.	RESISTANCE TO CORROSION						
13.	RESISTANCE TO WHITE SPIRIT						
14.	RESISTANCE TO MINERAL OIL						

contd.....

Annexure XX (a) ..(contd)

S.No.	Nature of Tests	Actual Test Results				Specified Requirements.	Tested by (Name with S
		Sample No.	Sample No.	Sample No.	Sample No.		
15.	RESISTANCE TO GASOLINE						
16.	WEIGHT PER IMPERIAL GALLON						
17.	LEAD RESTRICTION TEST (ACID SOLUBLE LEAD AS Pbo).						
18.	WEATHERING TEST						
19.	CHEMICAL TESTS						
20.	OTHER TESTS						

21. REMARKS

TESTED BY

Name_____

Initial_____

Time_____

Date_____

SENIOR INSPECTOR/ASSTT.DIRECTOR

NAME_____

DESIG_____

ANNEXURE XX (b)

Wing:_____

Lab: _____

LABORATORY TEST REPORT PROFORMA

(ROPES/CORDAGES/LINES/THREADS/YARNS)

(For internal use in Lab only).

Test Report No._____

Nomenclature:

Forwarding Note:

Specn/Drg/Tech Data:

Sample (s) No.:

Type of Sample (s):

Date Sample (s) recd:

Date Sample (s) reported:

PART - I

S.No.	Nature of Tests	Actual Test Results				Specified Require-ments.	Tested by (Name with Sign).
		Sample No. (	Sample No.	Sample No.	Sample No.		
1.	PHYSICAL TESTS						
1.	Material						
2.	Circumference/Diameter.						
3.	Construction:						
	a. No of Plies						
	b. No of Strand						
	c. No of threads per strands						
	d. Type of lay						
	e. Direction of Twist						
	(1) Single						
	(2) Folded						
4.	Balance of Twist						
5.	Length per _____(give Wt)						
6.	Length per _____(unit e.g. tube, Ball).						

contd.....

Annexure XX (b) ..(contd

S.No.	Nature of Tests	Actual Test Results				Specified Requirements.	Tested by (Name with Si
		Sample No.	Sample No.	Sample No.	Sample No.		

7. Count of yarn
8. Twists/Turns pee_____
9. Weight per_____
   (Cord/RH_____%at_____F°C°)
10. Breaking Strength
    (BG/RH_____% at_____F°C°)
11. Uniformity

CHEMICAL TESTS

12. Nature of
13. Dye Fastness to Washing
    Test No._____:
    a. Change in Shade
    b. Staining on:
       (1) Cotton piece
       (2) Woollen piece
14. Dye Fastness to Rubbing:
    a. Staining on :
       (1) Cotton piece
       (2) Woollen piece
15. Dye fastness to light
16. Other Tests

Annexure XX (b) ..(contd)

PART - II

TESTED BY
a. Names
b. Signature
c. Time & Date

CHECKED BY
a. Names
b. Signature
c. Time & Date

PART- III

DETAILS OF TESTS CARRIED OUT BY GO LAB

S.No.	Nature of Tests	Results	Specified Requirements

Time:_____
Date:_____

Group Officer
Name:_____
Desig:_____

PART- IV

DETAILS OF TESTS CARRIED OUT BY OIC LAB

S.No.	Nature of Tests	Results	Specified Requirements

Remarks:

Time:_____
Date:_____

Semior Inspector/Asstt.Director
Name:_____

LABORATORY TEST REPORT PROFORMA Annexure XX (b)...(con

(ROPES/CORDAGES/LINES/THREADS/YARNS)

(For external use)

Wing:_____ Rest Report No._____

Lab :_____ Copy No._____

Nomenclature :

Forwarding Note :

Specn/Drg/Tech Data

Sample (s) No:

Type of Sample (s):

Date Sample (s) recd:

Date Sample (s) reported:

S.No.	Nature of Tests	Actual Test Results				Specified Requirements
		Sample No.	Sample No.	Sample No.	Sample No.	
	PHYSICAL TESTS					
1.	Material					
2.	Circumference/Diameter					
3.	Construction:					
	a. No of Plies					
	b. No of strands					
	c. No of threadsper strand					
	d. Type of lay					
	e) Direction of twist					
	(1) Single					
	(2) Folded					
4.	Balance of Twist					
5.	Length per_____(e.g. tube, Ball)					
6.	Count of yarn					
7.	Twists/Turns per_____					

contd.....

S.No.	Nature of Tests
9.	Weight per_____ (Cond/RH_____%at • ___F°C°)
10.	Breaking Strength (BG/RH_____ _____%at_____F°C°)
11.	Uniformity
	CHEMICAL TESTS
12.	Nature of Dye
13.	Dye Fastness to washing Test No._____:-
	a. Change in shade
	b. Staining on:
	(1)Cotton piece
	(2)Woollen piece
14.	Dye Fastness to Rubbing
	a. Staining on :
	(1) Cotton piece
	(2) Woollen piece
15.	Dye Fastness to light
16.	Other Tests.
17.	Remarks

Time_____

Date_____

Annexure XX (b) .....(con

Actual Test Results				Specified Requirements
Sample No.	Sample No.	Sample No.	Sample No.	

Senior Inspector/Asstt.Director

NAME_____

DESIG_____

ANNEXURE XXI

DETERMINATION OF WORK LOAD AND STAFF REQUIREMENT AS PROPOSED BY DIRECTOR, CENTRAL TESTING LABORATORY IN 1971.

It is very difficult to assess the staff requirements on the basis of samples received for test. In addition to routine testing we have to consider the development and planning activities of the laboratories as well. The nature of samples received is quite divergent and the time required varies from sample to sample. An attempt has been made in the following paragraphs to determine the work load approximately on the basis of the average of the last 4 years (July 1966 to June 1970).

Ordinarily for facilitating the task of determining the work load the samples may be divided into three main categories:

I. PHYSICAL AND ENGINEERING WING

A) Textile Division:

Category I. This category requires the following tests and 2 man-hours are required to carry out these tests. About 35% samples of this category were tested -

i) Ends per inch
ii) Picks per inch
iii) Weight per square yard.

Category II. This category requires the following tests and 5 man-hours. 50% samples of this category were tested -

i) Ends per inch
ii) Pick per inch
iii) Weight per square yard
iv) Count of warp/weft
v) Breaking strength of warp and weft.

contd.....

Annexure XXI (contd)

Category III. Following tests - 10 man hours - 5% samples of this category:

i) Ends per inch
ii) Pick per inch
iii) Weight per square yard
iv) Shrinkage
v) Weighing strength of warp and weft
vi) Material content.

A small percentage of samples tested required about 30 man-hours.

B. Electrical and Mechanical Division :

Category I : Following tests - 10 man-hours - about 47%

i) Tensile strength
ii) Elongation %
iii) Yield stress
iv) Bend test
v) Hardness
vi) Dimensions
vii) Weight per foot.

Category II : Following tests - 13 man hours - about 47%

i) Overall dimension
ii) Radial thickness of sheath
iii) Radial thickness of Insulation
iv) Diameter of conductor
v) High voltage test
vi) Insulation resistance
vii) Electrical resistance of conductor
viii) Tensile and elongation of conductor

continued.....

Category III : Following tests - 60 man-hours - about 6% samples

i) Lamp dimensions
ii) Starting characteristics
iii) Wattage
iv) Voltage at lamp terminals
v) Nominal pre-heating current
vi) Nominal running current
vii) Light test of bulb and tube light
viii) Torsion test
ix) Colour characteristic

C. Cement & Building Material Division:

Category I : Following tests - 3 man-hours - about 87% samples

i) Compressive strength of cement concrete, tube block and cylinder

Category II: Following tests - 20 man hours - about 11% samples

i) Consistency
ii) Setting time
iii) Soundness
iv) Fineness (specific surface)
v) Hydration
vi) Compressive strength

Category III: Following tests - 35 man-hours - about 2% samples

i) Density
ii) Abrasion
iii) Porosity
iv) Impact value
v) Crushing value
vi) Void test
vii) Weathering test
viii) Weight per cubic foot
ix) Compressive strength

Annexure XXI .(cont)

D. Organic & Inorganic Chemical Division — Chemical testa re time consuming, delicate and require skill in different fields. Nature of samples is quite divergent.

Category I : Following tests - 12 man-hours - about 20% samples.
Qualitative analysis of determination of one element.

Category II : Following tests - 13 man-hours - about 50% samples.

i) Viscocity Redwood
ii) Viscosity index
iii) Flash point
iv) Acide and base number
v) Specific gravity
vi) Water content
vii) Distillation range
viii) Cloud and pour point
iv) Carbon residue

Category III : This category includes organic and incorganic, pure chemical, pure metal and complicated samples. Determination of impurity requires at least 60 man-hours - about 30% samples.

Occasionally samples are received which require research and development by analytical methods. The time required for such samples may vary from 60 to 180 man-hours.

An impression prevails thatthe entire testing work is done by Examiner or Senior Examiner and that the Assistant Director, Deputy Director and Director perform supervisory functions only. This is not correct. The testing process cannot commence without directions from the Director, Deputy Director and Assistant Director who prescribe a proper

contd.....

method and the equipment required. They are all along associated till the final result is arrived at and perform test checking of the results during the course of testing. The Deputy Director and Assistant Director re-test and check the results if they are either doubtful or incorrect. In case of disputed samples testing is carried out in the presence of the Director. The duty of Senior Examiner is that he tests the complicated samples and also assist the junior examiner in carrying out the test. The post also provides incentive to examiner for promotion.

ANNEXURE XXII

PAKISTAN STANDARDS INSTITUTION

SUBJECT :- LIST OF COMPULSORY ITEMS UNDER COMPULSORY CERTIFICATION MARKING FOR EXPORT

1st Phase w.e.f. (1st June, 1966)

1.	Portland Cement (Ordinary & Rapid Hardening)	PS: 232-1962
2.	Lead-Acid Storage Batteries for use in Motor Vehicles.	PS: 206-1962
3.	Dry Cells and Batteries	PS:433-1964(Pt-I) PS:433-1965(Pt-II) PS:433-1966(Pt-III)
4.	Induction Motors	PS: 186-1962

2nd Phase w.e.f. (1st July, 1968)

5.	A.C. Fans, Free-Air, Ceiling Table	PS: 1-1966(R)
6.	Propellor type A.C. Exhaust Fans	PS: 663-1968
7.	Electric Irons	PS: 185-1962
8.	Metal Clad Switches	PS: 712-1968
9.	Tumbler Switches	PS: 117-1960
10.	Electric Boiling Plates for domestic use	PS: 101-1960
11.	Portable Electric Immersion Heaters	PS: 252-1963
12.	Three pin plugs, Socket Outlets and Socket Outlet Adaptors	PS: 115-1960
13.	Two Pin Plugs and Socket Outlets of reversible type end without earth connections	PS: 102-1960

3rd Phase w.e.f. (1st July, 1969)

14.	Safety Razor Blades	PS: 219-1976(R)
15.	Laundry Soap	PS: 12-1978(R)
16.	Toilet Soap	PS: 13-1958
17.	Soft Soap	PS: 187-1962
18.	Carbolic Soap	PS: 181-1962
19.	Diesel Engine for General purpose	PS: 627-1967
20.	Tublar Flourescent Lamps for General lightining services	PS: 292-1973(R)

Contd.....

Contd.....Annexure XXII

4th Phase w.e.f. (1st July, 1971)

21.	Two and Three Terminal Ceiling Roses	PS: 116-1960
22.	Tungsten Filaments Lamps for general services	PS: 17-1973(R)
23.	Biscuits (excluding wafer biscuits)	PS: 383-1964
24.	Wafer Biscuits	PS: 614-1966
25.	PVC Insulated Cables (non armoured) for Electric power and lighting	PS: 714-1976(R)
26.	Sulphate Resisting Portland Cement Type 'A'	PS: 612-1967

5th Phase w.e.f. (21st November, 1974)

27.	Test and Inspection Chart for Centre Lathe upto 800 mm swing	PS: 785-1970
28.	Sizes for general purpose Lathe	PS: 880-1972
29.	Test Chart for Capstan and Turret Lathes	PS: 881-1972
30.	Accuracy of Machine Tools and Methods of testurret and single coordinated drilling machine	PS: 956-1979(R)
31.	Test conditions for radial drilling machines with arm adjustable in height testing accuracy	PS: 917-1974(R)
32.	General requirements for sewing machines	PS: 624-1975(R)
33.	Presser foot for sewing machine	PS: 623-1975(R)
34.	Needle bar for sewing machine	PS: 622-1975(R)
35.	Presser bar for sewing machine	PS: 621-1975(R)
36.	Bicycle Frames	PS: 462-1964
37.	Handle Bar	PS: 463-1964
38.	Pedal Assembly	PS: 464-1964
39.	Seat Pillar	PS: 466-1964
40.	Bicycle spoke including Nipples and washers	PS: 465-1964
41.	Bicycle Rim	PS: 861-1971
42.	Bicycle Hub Assembly	PS: 862-1971

Contd.....

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Contd.....Annexure XXII

6th Phase w.e.f. (19th May, 1976)

43.	Asbestos Cement Corrugated sheets for roofing and clading	PS: 430-1964
44.	Asbestos Cement flat sheets	PS: 579-1966
45.	Electric Kettles	PS: 253-1963
46.	Ballast for flourescent lamps	PS: 497-1965
47.	Electric Toaster	PS: 661-1967
48.	Mild steel oil Pressure utility stoves	PS: 797-1970
49.	Oil Pressure Stoves Brass Type	PS: 682-1979(R)
50.	Non-pressure Oil Stoves	PS: 928-1972

7th Phase w.e.f. (20th June, 1978)

51.	Protective Helmet for Road users	PS: 1402-1978

LIST OF COMPULSORY CERTIFICATION MARKING FOR HOME MARKET

1st Phase for home Market w.e.f. (31-5-1976)

1.	Asbestos Cement Corrugated sheets for roofing and clading	PS: 430-1964
2.	Asbestos Cement flat Sheets	PS: 579-1966
3.	Electric Kettles	PS: 253-1963
4.	Ballast for Flourescemt Lamps	PS: 497-1965
5.	Electric Toaster	PS: 661-1967
6.	Mild steel oil pressure utility stoves	PS: 797-1970
7.	Oil Pressure Stoves Brass Type	PS: 682-1979(R)
8.	Non-pressure Oil Stoves	PS: 928-1972

2nd Phase for home market w.e.f. (20-6-1978)

9.	Protective Helmet for road users	PS: 1402-1978

ANNEXURE XXIII (

STATEMENT SHOWING THE LICENCES IN OPERATION DURING 1975-76

S.No.	Name & Address of Licensee	Name of the Product	Licence No.	Validity period	Date of issue	PS.No.
1.	M/s. Metalex Corp. Ltd., Karachi.	Fan	CM/L-3/64(R)	1-9-75 to 31-8-78	14-1-76	1-1966
2.	M/s. Zeal Pak Cement Industry, Hyderabad.	O.P. Cement	CM/L-5/66(R)	1-4-75 to 31-3-78	17-7-75	232-1962
3.	M/s. Pakistan Progressive Cement, Karachi.	O.P. Cement	CM/L-12/74(R)	16-5-75 to 15-5-76	4-9-75	232-1962
4.	M/s. National Cement Industry, Dandot.	O.P. Cement	CM/L-16/76	1-6-76 to 31-5-77	1-6-76	232-1962
5.	M/s. Rohri Cement Works, Rohri.	O.P. Cement	CM/L-18/66(R)	5-5-75 to 4-5-76	17-7-75	232-1962
6.	M/s. Pakistan Battery Mfg., Karachi	Dry Battery Cell	CM/L-29/71(R)	21-8-75 to 20-8-78	8-12-75	433-1965
7.	M/s. Asbestos Cement Industries, Karachi.	A.C. Pressure Pipes	CM/L-51/69(R)	16-6-75 to 15-6-77	17-1-76	428-1964
8.	M/s. Mohammad Hussain & Sons, Lahore.	Diesel Engine	CM/L-61/69(R)	22-7-75 to 21-7-76	11-8-75	627-1967
9.	M/s. Rohri Cement Works, Rohri.	S.R.Cement	CM/L-64/69	1-10-74 to 30-9-76	12-9-75	612-1967
10.	M/s. Kohinoor Chemical Co. Ltd., Karachi.	Toilet Soap	CM/L-81/76	16-12-75 to 15-2-77	15-2-76	13-1958
11.	M/s. Dada Soap Factory, Karachi.	Laundary Soap	CM/L-82/70(R)	1-12-75 to 30-11-78	11-12-75	12-1958
12.	M/s. Wazir Ali Industries, Hyderabad.	Toilet Soap	CM/L-84/73	11-6-75 to 10-6-76	3-9-75	13-1958
13.	M/s. PECO, Lahore.	Diesel Engine	CM/L-88/71	1-3-75 to 29-2-78	14-10-75	627-1967

Contd....

Contd....Annexure XXIII (a)

S.No.	Name & Address of Licensee	Name of the Product	Licence No.	Validity period	Date of issue	PS.No.
14.	M/s. English Biscuits Mfg. Co., Karachi.	Biscuits	CM/L-91/75	15-9-75 to 14-9-76	21-9-75	383-1964
15.	M/s. Union Industries Ltd., Karachi.	Biscuits	CM/L-92/76	16-4-76 to 15-4-77	15-4-76	383-1964
16.	M/s. A & B Food Industries, Karachi.	Biscuits	CM/L-95/75	15-9-75 to 14-9-76	18-9-75	383-1964
17.	M/s. Montgomery Flour & General Mills, Sahiwal	Biscuits	CM/L-97/76	15-5-76 to 14-5-77	15-5-76	383-1964
18.	M/s. Sun Shine Biscuits, Lahore.	Biscuits	CM/L-99/75	21-10-75 to 20-10-76	20-10-75	383-1964
19.	M/s. A & B Food Industries, Karachi.	Wafer Biscuits	CM/L-109/75	15-9-75 to 14-9-76	18-9-75	614-1965
20.	M/s. Esbhani Industries Ltd., Karachi.	Enamelled Copper Wire	CM/L-111/76	1-5-76 to 30-4-77	30-4-76	897-1972
21.	M/s. Kohinoor Battery Mfg., Ltd., Karachi.	Dry Battery Cell	CM/L-115/74	1-6-76 to 31-5-77	1-6-76	433-1965
22.	M/s. Treet Corp. Ltd., Karachi.	Razor Blade	CM/L-118/74	15-9-75 to 14-9-76	15-9-75	219-1973
23.	M/s. PECO, Lahore.	Lathe Machine	CM/L-120/75(R)	21-2-76 to 20-2-77	18-3-76	880-1972
24.	M/s. Wazir Ali Industries Ltd., Hyderabad.	Banaspati Ghee	CM/L-123/75(R)	1-4-76 to 31-3-77	26-3-76	221-1962
25.	M/s. A & B Food Industries, Karachi.	Banaspati Ghee	CM/L-128/75	15-11-75 to 14-11-76	14-11-75	221-1962
26.	M/s. Wahid Industries Ltd., Gujrat.	Fan	CM/L-129/75	16-7-75 to 15-7-76	15-7-75	1-1966

S.No.	Name & Address of Licensee	Name of the Product	Licence No.	Validity period	Date of issue	PS.NO.
27.	M/s. PECO, Lahore.	Shaping Machine	CM/L-130/75	16-7-75 to 15-7-76	16-7-75	787-1970
28.	M/s. Royal Confectionery Works, Karachi.	Biscuits	CM/L-131/75	16-7-75 to 15-7-76	16-7-75	383-1964
29.	M/s. PECO, Lahore.	Drill Machine	CM/L-132/75	1-8-75 to 31-7-76	2-8-75	786-1970
30.	M/s. Salika Sewing Machine Co., Karachi.	Sewing Machine	CM/L-133/76	16-2-76 to 15-2-77	15-2-76	621 to 624 1975
31.	M/s. A.G.E. Industries Ltd., Peshawer.	PVC Cables	CM/L-134/75	16-9-75 to 15-9-76	5-9-75	714-1968
32.	M/s. Moghal Engg. Co. Ltd., Sahiwal.	Lathe Machine	CM/L-135/75	21-9-75 to 20-9-76	24-9-75	383-1968
33.	M/s. Moghal Engg. Co. Ltd., Sahiwal.	Drill Machine	CM/L-136/75	21-9-75 to 20-9-76	24-9-75	786-1970
34.	M/s. Friends Engg. Works, Gujranwala.	Lathe Machine	CM/L-137/75	1-10-75 to 30-9-76	10-10-75	860-1972
35.	M/s. Sunshine Biscuits Ltd., Karachi.	Biscuits	CM/L-138/75	21-10-75 to 20-10-76	20-10-75	383-1964
36.	M/s. Amin Soap & Oil Industries, Karachi.	Laundary Soap	CM/L-139/75	10-12-75 to 9-12-76	8-12-75	12-1958
37.	M/s. Singer Industries (Pak) Ltd., Karachi.	Sewing Machine & Parts	CM/L-140/76	16-2-76 to 15-2-77	15-2-76	621 to 624-1975
38.	M/s. New Pak Cables Ltd., Lahore.	P.V.C. Cables	CM/L-141/76	1-3-76 to 28-2-77	1-3-76	714-1968
39.	M/s. Union Industries Ltd., Karachi.	Wafar Biscuits	CM/L-142/76	16-4-76 to 15-4-77	15-4-76	614-1966

ANNEXURE XXIII (b)

STATEMENT SHOWING THE LICENCES IN OPERATION DURING 1976-77.

S.No.	Name & Address of the licencee	Name of the Product	Licence No.	Validity period	Date of issue	PS.No.
1.	M/s. Rohri Cement Works, Rohri.	O.P. Cement	CM/L-18/66(R)	5-5-76 to 4-5-77	9-2-77	232-1962
2.	M/s. PECC, Lahore.	Induction Motor	CM/L-24/77	11-3-77 to 10-3-78	16-3-77	196-1962
3.	M/s. Kohinoor Razor Blade Factory, Karachi.	Razor Blade	CM/L-52/76	5-10-76 to 4-10-77	15-10-76	219-1973
4.	M/s. Ferozsons Labs. Nowshera.	Laundry Soap	CM/L-53/76	1-8-76 to 31-7-77	26-7-76	13-1958
5.	-do-	Toilet Soap	CM/L-54/76	1-8-76 to 31-7-77	26-7-76	13-1958
6.	M/s. Kohinoor Chemical Co. Ltd., Karachi.	Laundry Soap	CM/L-55/76	21-2-77 to 20-2-78	21-2-77	12-1958
7.	M/s. LEFO, Lahore.	Diesel Engine	CM/L-56/69(R)	10-7-76 to 9-7-79	19-10-76	627-1967
8.	M/s. Rohri Cement Works, Rohri.	S.R. Cement	CM/L-64/69(R)	1-10-76 to 30-9-77	9-2-77	612-1967
9.	M/s. Seimens Pakistan Engg. Co., Karachi.	Induction Motor	CM/L-83/70(R)	1-3-76 to 28-2-79	22-10-76	186-1962
10.	M/s. Wazir Ali Industries, Hyderabad.	Toilet Soap	CM/L-84/73(R)	11-8-76 to 10-8-77	15-7-76	13-1950

Contd.....Annexure XXIII (b)

S.No.	Name & Address of the Licencee	Name of the Product	Licence No.	Validity period	Date of issue	PS.No.
11.	M/s. English Biscuits Mfg. Co. Ltd., Karachi.	Biscuits	CM/L-91/77	15-6-77 to 14-6-78	25-6-77	383-1964
12.	M/s. A&B Food Industry, Karachi.	Biscuits	CM/L-95/76	20-12-76 to 19-12-77	29-12-76	383-1964
13.	-do-	Wafer Biscuits	CM/L-109/76	20-12-76 to 19-12-77	29-12-76	614-1966
14.	M/s. Treat Corporation Ltd., Karachi.	Razor Blade	CM/L-118/74(R)	15-9-76 to 14-9-77	24-9-76	219-1973
15.	M/s. Asaf Industry ltd., Shikarpur.	Banaspati Ghee	CM/L-121/75(R)	1-4-76 to 31-3-77	28-8-77	221-1962
16.	M/s. Wazir Ali Industry Ltd., Hyderabad.	Banaspati Ghee	CM/L-123/77	1-6-78 to 31-8-79	6-6-77	221-1962
17.	M/s. Bengal Vegetable Ind., Ltd., Karachi.	Banaspati Ghee	CM/L-124/75(R)	1-4-76 to 31-3-77	15-7-76	221-1962
18.	M/s. Hydari Industry, Hyderabad.	Banaspati Ghee	CM/L-125/75(R)	15-4-76 to 14-4-77	7-7-76	221-1962
19.	M/s. PECO, Lahore.	Shaping Machine	CM/L-130/77	15-5-77 to 15-5-78	26-5-77	787-1970
20.	M/s. PECO, Lahore.	Drilling Machine	CM/L-132/76	20-10-76 to 19-10-77	21-10-76	786-1970
21.	M/s. Crown Foundry & Workshop, Gujranwala.	Lathe Machine	CM/L-143/76	16-7-76 to 15-7-77	15-7-76	830-1972
22.	M/s. Crown Foundry & Workshop, Gujranwala.	Drilling Machine	CM/L-144/76	16-7-76 to 15-7-77	15-7-76	786-1970

S.No.	Name & Address of the Licencee	Name of the Product
23.	M/s. Noor Engg. Works, Lahore.	Drilling Machine
24.	M/s. Asbestos Cement Ind., Karachi.	A.C. Flat Sheet
25.	M/s. Asbestos Cement Ind., Karachi.	A.C. Corrugated Sheet
26.	M/s. Noor Engg. Works, Lahore.	Lathe Machine
27.	M/s. Basra Soap Factory, Karachi.	Laundry Soap
28.	M/s. General Soap Industry, Karachi.	Toilet Soap

Contd.....Annexure XXIII (b)

Licence No.	Validity period	Date of issue	FS.No.
CM/L-145/76	25-11-76 to 24-11-77	24-11-76	786-1970
CM/L-146/76	15-10-76 to 14-10-77	13-10-76	579-1966
CM/L-147/76	15-10-76 to 14-10-77	13-10-76	430-1964
CM/L-148/76	25-11-76 to 24-11-77	24-11-76	880-1972
CM/L-149/76	15-2-77 to 14-2-79	17-2-77	12-1958
CM/L-150/77	5-5-77 to 5-5-78	16-5-77	13-1938

ANNEXURE XXIII (c)

STATEMENT SHOWING THE LICENCE IN OPERATION DURING 1977-78.

S.No.	Name & Address of the Licencee	Name of the Product	Licence No.	Validity period	Date of issue	I.S. No.
1.	M/s. Wah Cement Works, Wah.	O.P. Cement	CM/L-34/78	1-7-78 to 30-6-79	29-6-78	232-1962
2.	M/s. Kohinoor Razor Blade Factory, Karachi.	Razor Blade	CM/L-52/76(R)	5-10-77 to 4-10-78	12-2-78	219-1973
3.	M/s. Pakistan Cables Ltd., Karachi.	PVC Cables & Flexible Cords	CM/L-77/73(R)	1-9-76 to 31-8-78	29-11-77	714-1968
4.	M/s. Nowage Cables, Lahore.	P.V.C. Cables	CM/L-108/78	15-4-78 to 14-4-79	16-4-78	714-1968
5.	M/s. Prima Industries, Lahore.	Lathe machine	CM/L-127/77	1-12-77 to 30-11-79	29-11-77	886-1972
6.	M/s. PECO, Lahore.	Drill Machine	CM/L-132/76(R)	20-10-77 to 19-4-79	17-4-78	786-1970
7.	M/s. Salika Sewing Machine Co., Karachi.	Sewing Machine & Parts	CM/L-133/76	1-8-77 to 31-7-79	1-8-77	621 to 624-1979
8.	M/s. Amin Soap Oil Industry, Karachi.	Laundry Soap	CM/L-139/78	20-5-78 to 19-5-79	7-6-78	12-1958
9.	M/s. Singer Industry (Pak) Ltd., Karachi.	Sewing Machine & Parts	CM/L-140/76(R)	16-2-77 to 15-2-79	1-8-77	621 to 624-1975
10.	M/s. Union Industry Ltd., Karachi.	Wafer Biscuits	CM/L-142/78	1-10-78 to 30-9-79	16-10-77	614-1966

Contd.....Annexure XXIII (c)

S.No.	Name & Address of the licencee	Name of the Product	Licence No.	Validity period	Date of issue	PS.No.
11.	M/s. Crown Foundry & Workshop, Gujranwala.	Lathe Machine	CM/L-143/78	1-3-78 to 28-2-79	29-3-78	785-1970 880-1972
12.	M/s. Wazir Ali Inds., Ltd., Karachi.	Laundry Soap	CM/L-151/77	19-12-77 to 18-12-78	26-12-77	12-1958
13.	M/s. Zum Zum Soap Factory Ltd., Karachi.	Laundry Soap	CM/L-152/78	1-4-78 to 31-3-79	19-4-78	12-1958
14.	M/s. New Forward Engg. Co., Gujranwala.	Lathe Machine	CM/L-153/78	10-4-78 to 9-4-79	12-4-78	785-1970 880-1972
15.	M/s. Ulbrichets (Pak) Ltd., Karachi.	Protective Helmet	CM/L-154/78	23-5-78 to 22-5-79	23-5-78	1402-197
16.	M/s. Akyama Battery Co., Lahore.	Wet Battery	CM/L-155/78	10-6-78 to 9-6-79	10-6-78	206-1962
17.	M/s. Zam Rock Fibre Glass Corp., Lahore.	Protective Helmet	CM/L-156/78	17-6-78 to 16-6-79	17-6-78	1402-197
18.	M/s. Marshall Batteries, Lahore.	Wet Battery	CM/L-157/78	1-7-78 to 30-6-79	29-6-78	206-1962

STATEMENT SHOWING THE LICENCES IN OPERATION DURING 1978-79.

ANNEXURE XXIII (d)

S.No.	Name & Address of the Licencee	Name of the Product	Licence No.	Validity Period	Date of issue	PS.No.
1.	M/s. Metalex Corp. Ltd., Karachi.	Fan	CM/L-3/64(R)	1-9-78 to 31-8-81	24-2-79	1-1966
2.	M/s. Maple Leaf Cement, Iskanderabad.	O.P. Cement	CM/L-6/79	15-1-79 to 14-1-80	21-1-79	232-1962
3.	M/s. Climax Engg. Co., Gujranwala.	Fan	CM/L-10/78	25-9-78 to 24-9-78	28-9-78	1-1966
4.	M/s. Kohinoor Razor Blade Factory, Karachi.	Razor Blade	CM/L-52/76(R)	5-10-78 to 4-4-80	8-3-79	219-1973
5.	M/s. Ferozons Lab. Ltd., Nowshera.	Laundry Soap	CM/L-53/78	1-8-78 to 31-7-79	20-9-78	12-1958
6.	-do-	Toilet Soap	CM/L-54/78	1-8-78 to 31-7-79	20-9-78	12-1958
7.	M/s. Dada Soap Factory, Karachi.	Laundry Soap	CM/L-82/70	1-12-78 to 30-11-80	27-12-78	12-1958
8.	M/s. Wazir Ali Industries, Hyderabad.	Toilet Soap	CM/L-84/79	15-1-79 to 14-1-80	21-1-79	12-1958
9.	M/s. PECO, Lahore.	Diesel Engine	CM/L-80/71(R)	1-3-78 to 29-2-80	24-10-78	627-1967
10.	M/s. English Biscuits Mfg. Co., Karachi.	Biscuits	CM/L-91/77(R)	15-6-78 to 14-6-79	20-9-78	333-1964
11.	M/s. Union Industry Ltd., Karachi.	Biscuits	CM/L-92/76	1-10-78 to 30-9-79	16-10-78	333-1964
12.	M/s. A&B Food Industries, Karachi.	Biscuits	CM/L-95/76(R)	20-12-77 to 19-8-79	30-7-79	333-1964

S.No.	Name & Address of the Licencee	Name of the Product
13.	M/s. Montgomory Flour & General Mills, Sahiwal.	Biscuits
14.	M/s. Ferozsons Labs. Nowshera.	Carbolic Soap
15.	M/s. Treet Corp. Ltd., Karachi.	Razor Blade
16.	M/s. PECO, Lahore.	Lathe Machine
17.	M/s. Wahid Industries, Gujrat.	Fan
18.	M/s. PECO, Lahore.	Shaping Machine.
19.	M/s. Royal Confectionary Works, Karachi.	Biscuits
20.	M/s. Sunny Biscuits, Lahore.	Biscuits
21.	M/s. Amin Soap & Oil Industries, Karachi.	Laundry Soap
22.	M/s. Singer Industries (Pak) Ltd., Karachi.	Sewing Machine
23.	M/s. Zum Zum Soap Factory, Karachi.	Laundry Soap
24.	Crescent Pak Industries Ltd., Karachi.	Laundry Soap
25.	M/s. Crescent Pak Inds., Ltd., Karachi.	Toilet Soap

Contd.....Annexure XXIII (d)

Licence No.	Validity Period	Date of issue	FS. No.
CM/L-97/79	1-4-79 to 31-3-80	19-5-79	383-1964
CM/L-98/78	1-8-78 to 31-7-79	20-9-78	181-1962
CM/L-118/74(R)	15-3-77 to 13-9-80	10-1-79	219-1975
CM/L-120/77	15-10-78 to 14-10-79	19-10-78	880-1972
CM/L-129/78	1-8-78 to 31-7-79	10-8-78	1-1966
CM/L-130/77(R)	16-5-78 to 15-5-79	27-11-78	787-1970
CM/L-131/78	24-12-78 to 23-12-79	24-12-78	383-1964
CM/L-138/79	1-3-79 to 29-2-80	4-3-79	383-1964
CM/L-139/79	1-8-79 to 31-7-80	30-7-79	12-1978
CM/L-140/76(R)	16-2-79 to 15-2-80	24-2-79	621 to 624-1975
CM/L-152/78(R)	1-4-79 to 31-3-80	25-4-79	12-1958
CM/L-159/79	20-1-79 to 19-1-80	21-1-79	12-1958
CM/L-160/79	1-2-79 to 31-1-80	3-2-79	13-1958

Contd.....Annexure XXIII (d)

S.No.	Name & Address of the Licencee	Name of the Product	Licence No.	Validity Period	Date of issue	PS. No.
26.	M/s. Climex Engg. Co. Ltd., Gujranwala.	Induction Motor	CM/L-161/79	3-4-79 to 2-4-80	3-4-79	186-1962
27.	M/s. Fazal Industries Ltd., Islamabad.	Laundry Soap	CM/L-162/79	25-4-79 to 24-5-80	25-4-79	12-1978
28.	M/s. Kausar Industries, Gujranwala.	Lathe Machine	CM/L-163/79	20-5-79 to 19-5-80	20-5-79	880-1972
29.	M/s. Eagle Machinery Services, Lahore.	Lathe Machine	CM/L-164/79	15-6-79 to 14-6-80	14-6-79	785-1970 880-1972

ANNEXURE XXIII (e)

STATEMENT SHOWING THE LICENCES IN OPERATION DURING 1979-80

S.No.	Name & Address of Licencee	Name of the Product	Licence No.	Validity Period	Date of issue	PS.No.
1.	M/s. Rohri Cement Works, Rohri.	O.P. Cement	CM/L-18/80	1-5-80 to 30-4-81	1-5-80	232-1962
2.	M/s. Asbestos Cement Industries Ltd., Karachi.	A.C. Pressure Pipes	CM/L-51/69(R)	16-6-77 to 15-6-80	21-1-80	426-1964
3.	M/s. Ittefaq Foundries Ltd., Lahore.	Diesel Engine	CM/L-56/80	15-2-80 to 14-2-81	16-2-80	627-1967
4.	M/s. Rohri Cement Works, Rohri.	S.R. Cement	CM/L-64/80	1-5-80 to 30-4-81	1-5-80	612-1967
5.	M/s. Wazir Ali Industries Ltd., Hyderabad.	Toilet Soap	CM/L-84/79(R)	15-1-80 to 14-1-81	6-3-80	13-1958
6.	M/s. A&B Food Industries, Karachi.	Biscuits	CM/L-95/79	1-10-79 to 30-9-80	1-10-79	383-1964
7.	M/s. PECO, Lahore.	Lathe Machine	CM/L-120/80	15-4-80 to 14-4-81	15-4-80	886-1972
8.	M/s. Yunas Metal Works Regd., Gujrat.	Eshaust Fan	CM/L-126A/80	10-1-80 to 9-1-81	10-1-80	663-1968
9.	M/s. Wahid Industries Ltd., Gujrat.	Electric Fan	CM/L-129/78(R)	1-8-79 to 31-7-80	9-10-79	1-1966(R)
10.	M/s. PECO, Lahore.	Shaping Machine	CM/L-130/77(R)	16-5-80 to 15-5-81	25-5-80	787-1970
11.	M/s. Royal Confectionery Works, Karachi.	Biscuits	CM/L-131/78(R)	24-12-79 to 23-12-80	7-2-80	383-1964

S.No.	Name & Address of Licencee
12.	M/s. PECO, Lahore.
13.	M/s. Salika Sewing Machine Co., Karachi.
14.	M/s. Sunny Biscuit Ltd., Lahore.
15.	M/s. Singer Industries (Pak) Ltd., Karachi.
16.	M/s. Asbestos Cement Industries Ltd., Hyderabad.
17.	M/s. Wazir Ali Industries Ltd., Karachi.
18.	M/s. Zum Zum Soap Factory Ltd., Karachi.
19.	M/s. Climax Engg. Co., Ltd., Gujranwala.
20.	M/s. Colony Textile Mills Ltd., Multan.
21.	M/s. Progressive Rubber Product, Ltd., Karachi.
22.	M/s. Yakoob Biscuit Factory, Sukkur.
23.	M/s. Golden Industries Ltd., Karachi.

-: ANNEX :-

Contd.....Annexure XXIII (e)

Name of the Product	Licence No.	Validity Period	Date of issue	PS.No.
Drilling Machine	CM/L-132/79	1-11-79 to 31-10-80	5-11-79	786-197
Sewing Machine & Parts	CM/L-133/77(R)	1-8-79 to 31-7-81	16-8-79	621 to 624-197
Biscuits	CM/L-138/79(R)	1-3-80 to 28-2-81	1-3-80	383-196
Sewing Machine & Parts	CM/L-140/76(R)	16-2-80 to 15-2-82	13-2-80	621 to 624-197
A.C. Flat Sheets	CM/L-146/76(R)	15-10-77 to 14-10-80	27-4-80	579-196
Laundry Soap	CM/L-151/79	15-12-79 to 14-12-80	30-12-79	12-1978
Laundry Soap.	CM/L-152/78(R)	1-4-80 to 31-3-81	29-3-80	12-197
Induction Motor	CM/L-161/79(R)	3-4-80 to 2-4-81	30-4-80	186-19
Cotton Yarn Grey	CM/L-165/79	1-10-79 to 30-9-80	15-10-79	1338-19
Hot Water Bottle	CM/L-166/80	1-1-80 to 31-12-80	1-1-80	751.19
Biscuits	CM/L-167/80	1-1-80 to 31-12-80	1-1-80	383-19
Bicycle Hub Assembly	CM/L-168/80	15-2-80 to 14-2-81	11-2-80	862-19

S.No.	Name & Address of Licencee	Name of the Product
24.	M/s. Nawab Brothers (Regd), Lahore.	Lathe Machine
25.	-do-	Drilling Machine
26.	-do-	Shaping Machine
27.	M/s. Pak Electric Inds. (Regd), Gujrat.	Fan
28.	M/s. Asbestos Cement Industries Ltd., Karachi.	A.C. Corrugated Sheets
29.	M/s. Pakistan Cables Ltd., Karachi.	PVC Electric Cables

Contd.....Annexure XXIII (e)

Licence No.	Validity Period	Date of issue	PS. No.
CM/L-169/80	10-4-80 to 9-4-81	10-4-80	380-1972
CM/L-170/80	1-5-80 to 30-4-81	29-4-80	786-1970
CM/L-171/80	1-5-80 to 30-4-81	29-4-80	787-1970
CM/L-26/79	20-8-79 to 19-8-80	20-8-79	1-1966(R
CM/L-147/76(R)	15-10-77 to 14-10-80	21-1-80	430-1964
CM/L-77/80	15-5-80 to 14-5-81	15-5-80	714-1974 (E

ANNEXURE XXIV

PAKISTAN STANDARDS INSTITUTION
(Certification Marks Division)

STATEMENT SHOWING THE DETAILS OF THE APPLICATIONS REJECTED FROM 1975 TO 1980

S.No.	Name and Address of the unit.	Name of the product	Position	Period	Against which PS:No. or other	Remarks
1.	M/s. Paramount Industries ltd., Karachi	Electricl Bulbs	Rejected	1975	PS: 17-1973	-
2.	M/s. National Wire & Cable Ind., Gujranwala	Enamelled Capper Conductors Round Wire	Rejected	1975	PS: 1844/52	-
3.	M/s. Shahid Engg. Corporation, Lahore.	Lathe Machines	Rejected	1976	PS: 785-1970	Licence was not given because lack of testing facilities.
4.	M/s. Atlas Rubber & Plastic Ind., Karachi.	Electric Cable Single Core 100 yard length	Rejected	1976	PS: 566/65 PS: 714/68	-
5.	M/s. New Pak Cables, Lahore.	PVC Insulated Single Core Copper Conductor Cables	Rejected	1977	PS: 566/65 PS: 714/68	-
6.	M/s. General Electric Fan Co., (Regd),Gujrat.	Fan	Rejected	1978	PS: 1-1966(R)	-
7.	M/s. Nasim Soap Factory, Jalal pur Jattan.	Laundry Soap	Rejected	1978	PS: 12-1978	-
8.	M/s. Kohinoor Oil Mills Ltd., Karachi.	Laundry Soap	Rejected	1978	PS: 12-1978	-

Contd....

S.No.	Name and Address of the Unit
9.	M/s. General Soap Inds., Kalakot, Karachi.
10.	M/s. Alaco Transfers & Printers, Rizvia Society, Karachi.
11.	M/s. Progressive Rubber Products, SITE, Karachi.
12.	M/s. Progressive Rubber Products, SITE, Karachi.
13.	M/s. Atlas Cables Ltd., Karachi.
14.	M/s. Hanif Soap Industries, Chakiwara, Karachi.
15.	M/s. Union Industries Ltd., SITE, Karachi.
16.	M/s. Prima Industries, Karachi.
17.	M/s. Marshal Battery, Islam pura, Lahore.
18.	M/s. Akyama Battery, Lahore.

Contd.....Annexure XXIV

Name of the product	Position	Period	Against which PS:No. or other	Remarks
Laundry Soap	Rejected	1978	PS: 12-1978	-
Safety Helmets	Rejected	1978	PS: 1402-1978	-
Rubber Inner Tubes for Bi-cycles	Rejected	1978	PS: 484-1965	-
Moulded Rubber Hot Water Bottle	Rejected	1979	PS: 751-1969	-
Alummunium Conductors Steel Reinforced	Rejected	1979	PS: 751-1969	-
Laundry Soap	Rejected	1979	PS: 12-1978	Licence was not granted because lack testing facilities.
Biscuits (Wafer)	Rejected	1980	PS: 614-1968	-
Lathe Machine	Rejected	1980	PS: 785-1970	-
Lead Acid Storage Battery	Rejected	1980	PS: 206-1962	-
Lead Acid Storage Battery	Rejected	1980	PS: 206-1962	-

REVIEW OF FACILITIES REQUIRED FOR THE TESTING OF INDUSTRIAL GOOD LISTED UNDER PSI CERTIFICATION MARK ORDINANCE, 1961

1st Phase w.e.f. (1st June: 1966) S.No. 1-4

S.No.	Specification No. with title	Testing facilities available/or not	Apparatus requir
1.	Portland cement (ordinary & Rapid Hardening). P.S. 232 - 1962	All tests possible except: i) Fineness test	i) Fineness test apparatus.
2.	Lead Acid Storage Batteries for use in Motor Vehicles P.S. 206: 1962	All tests possible except: i) Vibration test. ii) Rapid Discharge Test. iii) Life Cycle. iv) Retention.	
3.	Dry Cell & Batteries P.S. 433: 1964 (Pt. I) P.S. 433: 1964 (Pt.II) P.S. 433: 1964 (Pt.III)	All tests possible.	
4.	Induction Motors P.S. 186:1962	All tests possible except; i) Test for efficiency ii) Torque test.	

2nd Phase w.e.f. (1st July 1968) S.No.5-13

5.	A.C. Fans, Free-Air, Ceiling, Table P.S.1: 1966 (R).	All test possible	
6.	Propellor type A.C. Exhaust Fans P.S. 663: 1968	All tests possible except: i) Air Delivery test (Assessed on Draft Specification	
7.	Electric Irons P.S. 185: 1962	All tests possible except: i) Inaccessibility test.	

8.	Metal clad switches P.S. 712: 1968	All tests possible provided the line is made available to testing site. (Assessed on draft specification).	
9.	Tumbler switches P.S. 117: 1960	All tests possible except: i) Plastic veild test	
10.	Electric Boiling plates for domestic use. P.S. 101; 1960.	All tests possible: i) Earth contunity test	i) Source of 30 amp 6 watt A.C./D.C
11.	Portable Electric Immerson Heaters. P.S.252:1963	All tests possible except: i) Earthing and loading ii) Over heating.	
12.	Three pin plugs, socket outlets and socket outlet adaptors. P.S. 115: 1960	All tests possible except: i) Plastic yield test.	
13.	Two pin plugs and socket outlets of reversible type and without earth connection. P.S. 102 : 1960	All tests possible except: i) Plastic yield test.	
	3rd Phase w.e.f. (1st July 1969) S.No. 14 - 20		
14.	Safety Razor Blades	All tests possible except: i) Honing angle ii) Dimension test	
15.	Laundry soap P.S. 12: 1978 (R)	All tests are possible.	
16.	Toilet soap P.S. 13: 1959	All tests are possible.	

17. Soft soap
P.S. 187:1962

18. Carbolic soap
P.S. 181: 1962

19. Diesel Engine for general use
P.S. 627:1967

20. Tabular Flourescent Lamps
for general lighting services.
P.S. 292; 1973

4th Phase w.e.f. (1st July, 1971) S.No. 21

21. Two and three terminal ceiling roses
P.S. 116 : 1960

22. Tungsten Filament
Lamps for general services
P.S. 17: 1973

23. Biscuit
P.S. 383: 1964

24. Wafer Biscuits
P.S. 614: 1966

25. PVC Insulated cables (non armoured) for
Electric power and lighting
P.S. 714 :1976

26. Sulphate resistance Portland
cement type 'A'
P.S. 612: 1967

v :-

All tests are possible.

All tests are possible.

Testing can be done at the premisus of the manufacturer.

All testing facilities available.

All tests are possible except:
i) Plastic yield test.

All tests possible.

All tests possible.

All tests are possible.

All tests possible.

All tests are possible except:
i) Fineness test

Essjay

5th Phase w.e.f. (21st November, 1974

27. Test and Inspection chart for Centre Lathe upto 800 mm swing
P.S. 785: 1970

28. Sizes for general purpose Lathe
P.S. 880:1972

29. Test chart for capstan and Turret Lathes
P.S. 881: 1972

30. Accuracy of Machine Tools and method of test turret and single coordinated drilling machine.
P.S. 956:1979 (R)

31. Test conditions for radial drilling machines with arm adjustable in height testing accuracy.
P.S. 917: 1974 (R)

32. General requirements for sewing machines.
P.S. 624: 1975 (R)

33. Presser foot for sewing machine.
P.S. 623: 1975 (R)

34. Needle bar for sewing machine
P.S. 622: 1975 (R)

35. Pressure bar for sewing machine
P.S. 621: 1975 (R)

) S.No. 27 - 42

Specification not supplied by P.S.I as it is under revision/Print.	
No facilities available except hardness test.	
--- do ---	
Specification not supplied by P.S.I, as it is under revision/ print.	
--- do ---	
All tests possible.	
All tests possible.	
All tests possible except: i) Straightness.	
All tests possible except: i) Straightness.	

Essjay

46. Ballast for Flourescent lamps
P.S. 497: 1965

47. Electric Toaster
P.S. 661: 1967.

48. Mild Steel oil pressure utility stoves.
P.S. 797: 1970.

49. Oil pressure stoves Brass type.
P.S. 682: 1979 (R)

50. Non-pressure oil stoves
P.S. 928: 1972.

7th Phase w.e.f. (20th June, 1978)

51. Protective Helmet for Road users.
P.S. 1402: 1978.

Annexure XXV ...(con

All tests possible.

All tests possible.

All tests possible.

All tests possible.

All tests possible.

All tests possible except :
i) Shock absorption test
with Accelerometer.

36. Bicycle Frames
P.S. 462 : 1964

37. Handle Bar.
P.S. 463 : 1964

38. Pedal Assembly
P.S. 464: 1964

39. Seat Piller
P.S. 466 : 1964

40. Bicycle spoke including nipples and washers
P.S. 465: 1964

41. Bicycle Rim
P.S. 861 : 1971

42. Bicycle Hub Assembly
P.S. 862: 1971

6th Phase w.e.f. (19th May, 1976)

43. Asbestos cement corrugated sheets for roofing and cladding.

44. Asbestos cement Flat sheets.
P.S. 579: 1966

45. Electric kettles
P.S. 253: 1963

All tests possible.

All tests possible.

All tests possible.

All tests possible.

All tests possible.

All tests possible.

Specification not supplied by P.S.I. as it is under revision/print.

S.No.43 - 50

All tests possible except:
i) Bending stress
ii) Frost cracking test.

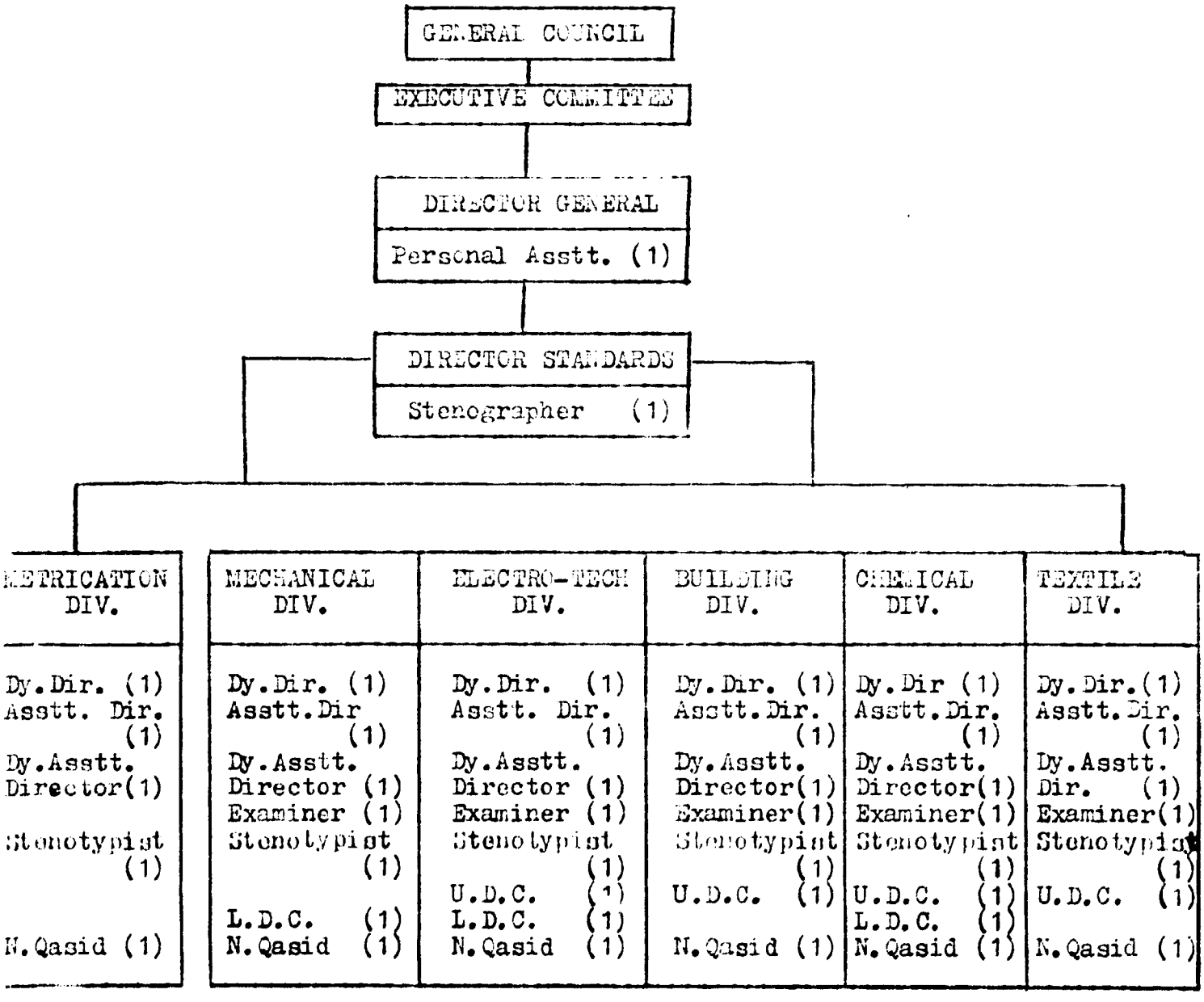
All tests possible except:
i) Bending stress
ii) Frost cracking test.

All tests possible.

ANNEXURE XXVI

(a)

PROPOSED SET UP OF PAKISTAN STANDARDS INSTITUTION

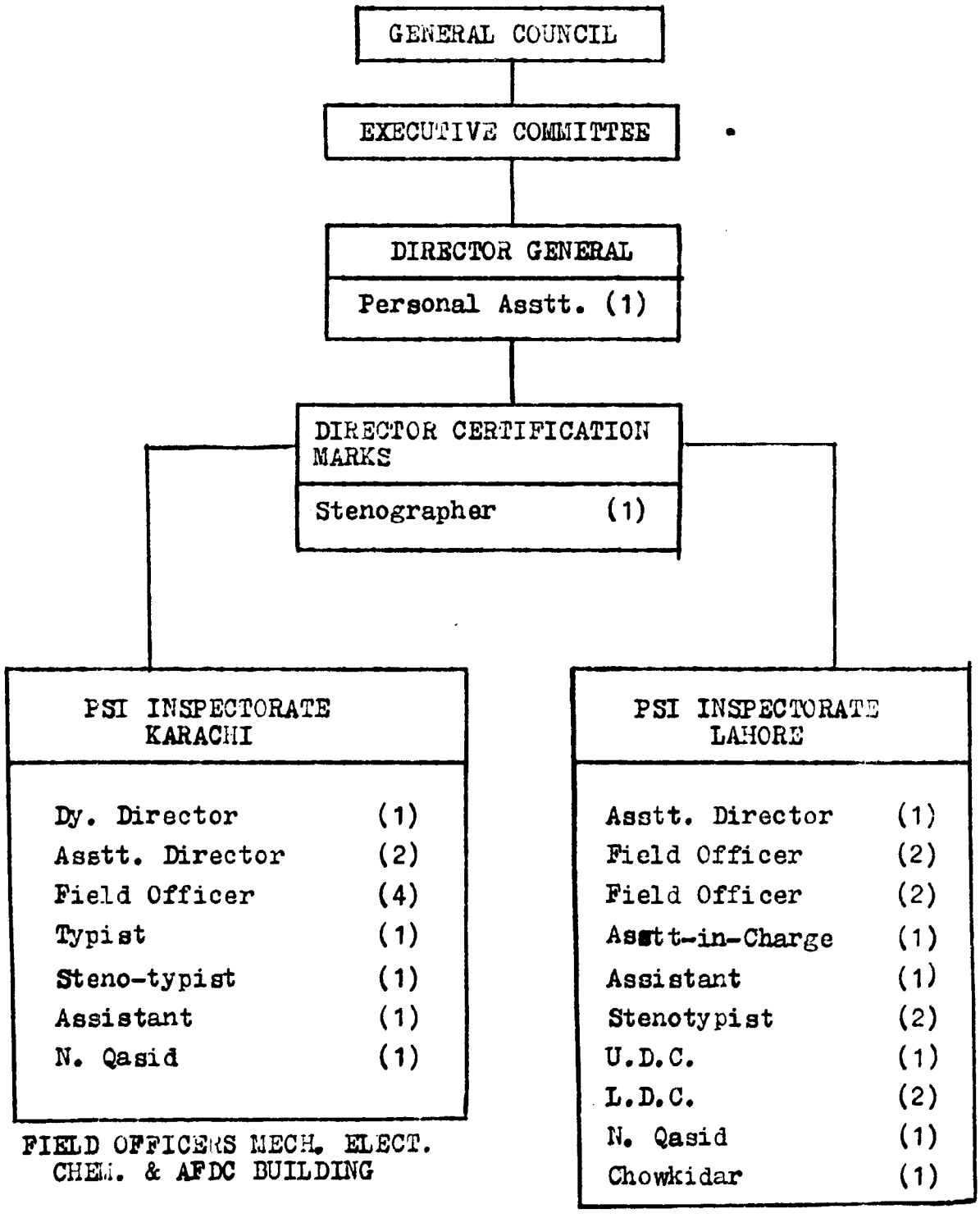


METRICATION DIV.	MECHANICAL DIV.	ELECTRO-TECH DIV.	BUILDING DIV.	CHEMICAL DIV.	TEXTILE DIV.
Dy.Dir. (1)	Dy.Dir. (1)	Dy.Dir. (1)	Dy.Dir. (1)	Dy.Dir (1)	Dy.Dir.(1)
Asstt. Dir. (1)	Asstt.Dir (1)	Asstt. Dir. (1)	Asstt.Dir. (1)	Asstt.Dir. (1)	Asstt.Dir. (1)
Dy.Asstt. Director(1)	Dy.Asstt. Director (1)	Dy.Asstt. Director (1)	Dy.Asstt. Director(1)	Dy.Asstt. Director(1)	Dy.Asstt. Dir. (1)
Stenotypist (1)	Examiner (1)	Examiner (1)	Examiner(1)	Examiner(1)	Examiner(1)
	Stenotypist (1)	Stenotypist (1)	Stenotypist (1)	Stenotypist (1)	Stenotypist (1)
	L.D.C. (1)	U.D.C. (1)	U.D.C. (1)	U.D.C. (1)	U.D.C. (1)
N.Qasid (1)	N.Qasid (1)	L.D.C. (1) N.Qasid (1)	N.Qasid (1)	L.D.C. (1) N.Qasid (1)	N.Qasid (1)

ANNEXURE XXVI

(b)

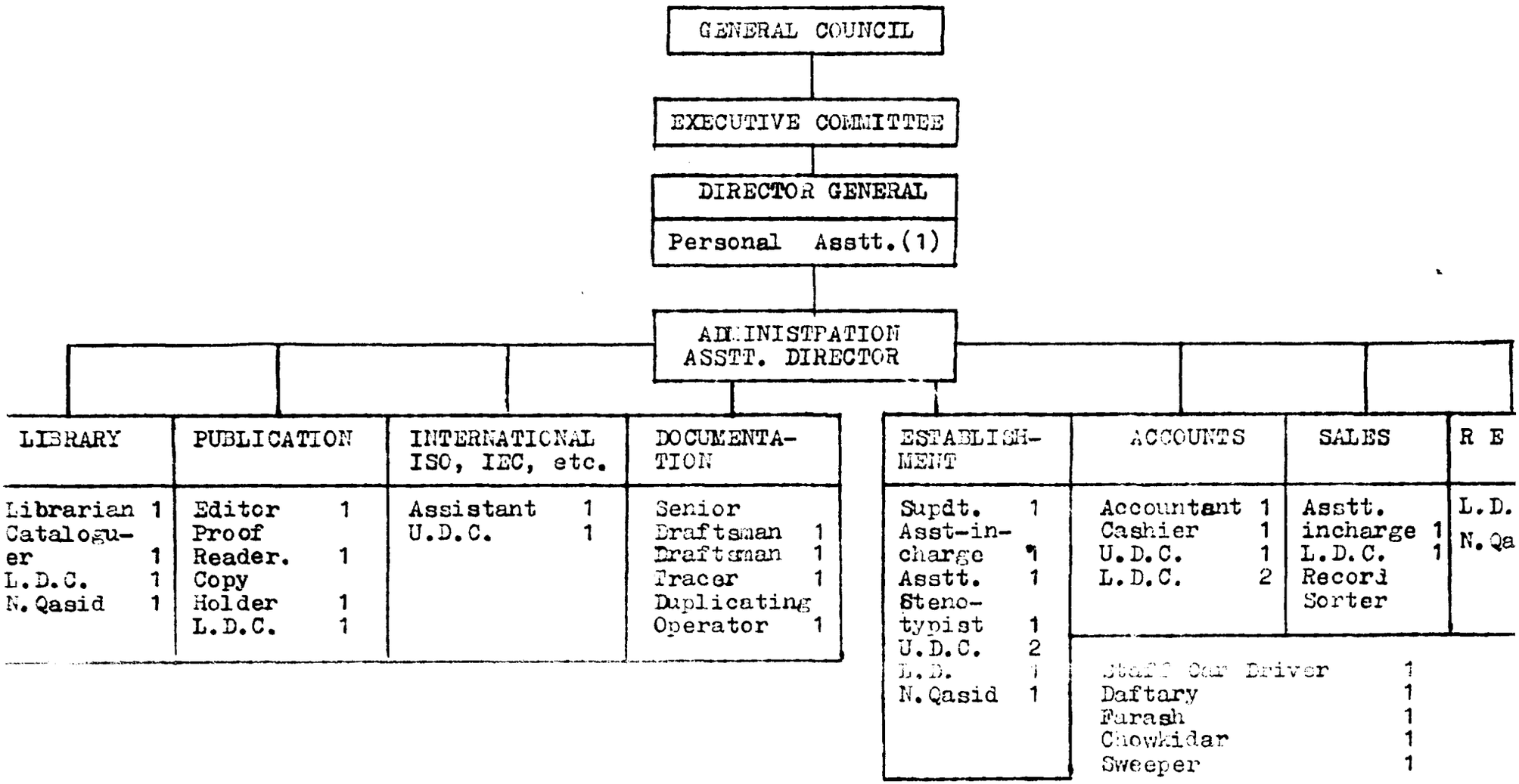
PROPOSED SET UP OF PAKISTAN STANDARDS INSTITUTION



ANNEXURE XXVI

(c)

PROPOSED SET UP OF PAKISTAN STANDARDS INSTITUTION



ANNEXURE XXVII

STANDARD FINALISED BY ALL THE TECHNICAL DIVISIONS OF PSI FOR THE YEAR 1975 TO 1980

	75-76	76-77	77-78	78-79	79-80	Total
AFDC	Nil	Nil	Nil	Nil	3	3
MDC	11	12	1	19	12	55
TDC	1	Nil	1	6	18	26
EDC	5	7	Nil	39	9	60
CDC	17	Nil	13	8	11	49
Building Div.	Nil	Nil	Nil	Nil	Nil	Nil
TOTAL	34	19	15	72	53	193

ANNEXURE XXVIII

LIST OF MAIN LABORATORIES OTHER THAN C.T.L.

1. Paramount Testing Laboratory,
Room-1, 1st Floor Dinar Chambers,
12-West Wharf Road,
KARACHI.

2. A C E Testing Lab.,
7-West Wharf Road,
KARACHI.

3. Defence Science & Technology Organisation,
Karachi Laboratory,
34-37, PNH Line,
KARACHI-Cantt.

4. National Health Laboratory,
ISLAMABAD.

5. Naval Dockyard,
KARACHI.

6. Pakistan Railways,
Moghalpura,
LAHORE.

7. Superintendent,
KMC Laboratory,
Near Guru Munder,
KARACHI.

8. PCSIR Laboratories,
Off University Road,
KARACHI.

9. PCSIR Laboratories,
Ferozpur Road,
LAHORE.

10. Pakistan Central Cotton Committee,
Molvi Tamizuddin Khan Road,
KARACHI.

11. Soil and Material Testing Labs.,
C-13, Block 20,
F.B. Area,
KARACHI.

Contd.....

Contd.....Annexure XXVIII

12. Soil Mechanics Ltd.,
150/S/2, PECHS,
KARACHI.

13. M/s. Feroz Sons Laboratories Ltd.,
197-The Mall,
RAWALPINDI.

14. University of Engineering & Technology,
Moghal Pura,
LAHORE.

15. Pakistan Railways Central Labs.,
Moghalpura,
LAHORE.

16, Inspectorate of Electronics and Instruments,
Fort Area,
CHAKLALA.

17. Chemical Laboratory (Custom),
167, Block II,
Khalid Bin Walid Road,
P.E.C.H.S.,
KARACHI.

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2. Draft Ordinance to regulate Inspection Agencies.

3. Draft Ordinance to provide Quality Control, Training, Process Improvement and Product Development in Industrial undertakings in Pakistan.

4. Import and Export (Control) Ordinance.

5. Export Quality Control Order 1973.

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   b) The Pakistan Standards Institution (Certification Marks) Ordinance 1961 as amended.

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    b) Revised Project Digest.

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27. Hongkong Government's Surveillance Export Licensing Scheme and Voluntary Scheme operated by Federation of Hongkong Industries.

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29. Commodity Inspection Law of Taiwan 1932 (as revised) and Constitution of Bureau of Commodity Inspection and Quarantine.

30. Ceylon Imports and Exports Control Act No.1 of 1969 and Constitution of Bureau of Ceylon Standards.

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31. Japan Export Inspection Law February 1970.

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"Establishment of Research Cells in Industrial Units" - 23 September 1980 'Business Recorder'
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