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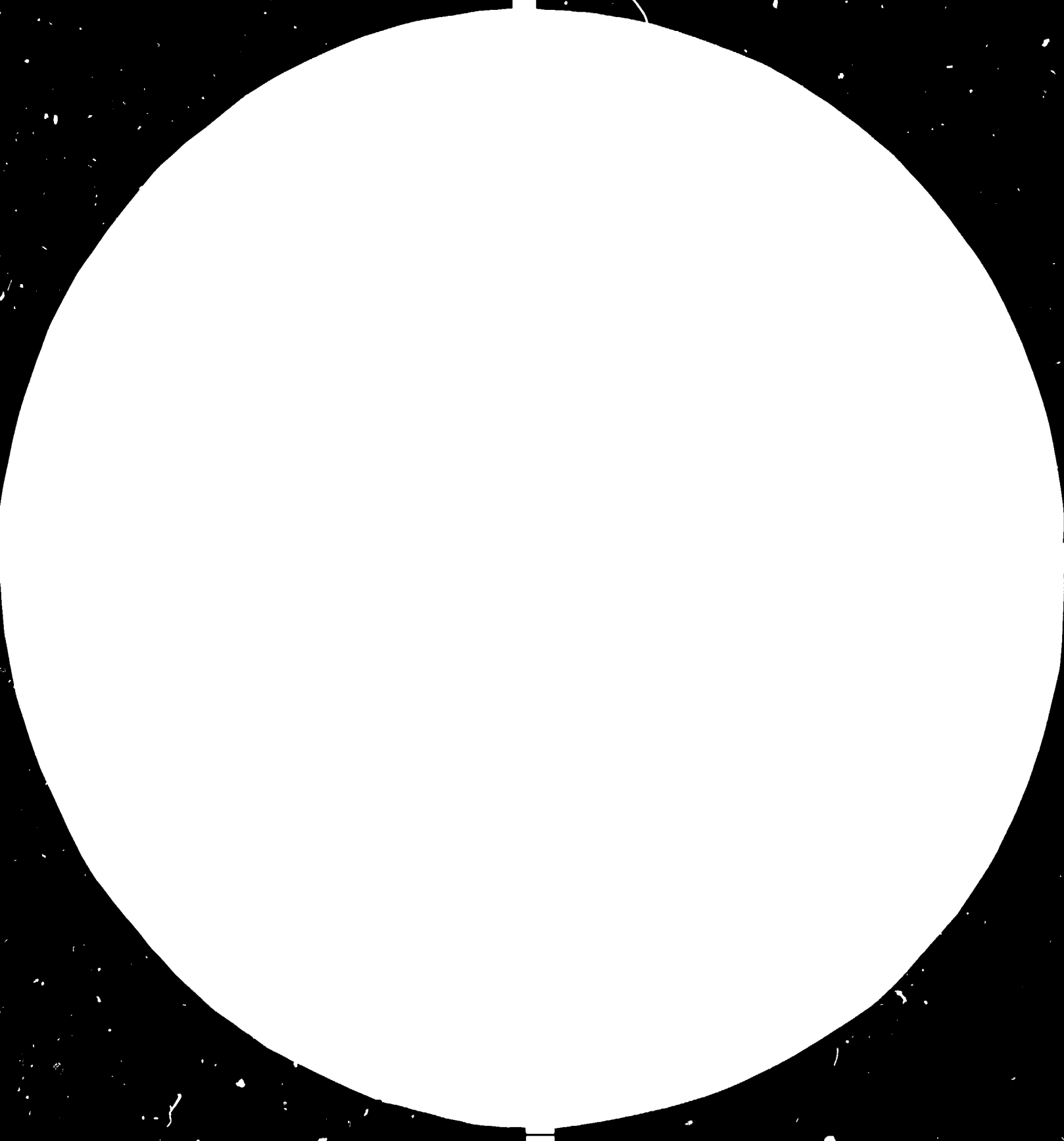
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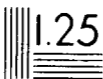


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10 September 1984  
English

Egypt.

ELECTRONIC INDUSTRIES RESEARCH  
AND DEVELOPMENT CENTER  
PHASE II

DP, EGY, 73, 003

ARAB REPUBLIC OF EGYPT

Terminal report\*

Prepared for the Government of Egypt  
by the United Nations Industrial Development Organization,  
acting as executing agency for the United Nations Development Programme

Based on the work of Bernarda Bartakowa,  
expert in environmental testing of electrical  
and electronic equipment

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Summary of consultant's activity at EIRDC, Cairo :

B. Bartakova arrived at Cairo on 23.5.1984 from Vienna ( arrival at Vienna on 21.5.1984 ). She started her work in EIRDC according to the job description ( Annex 1 ) on 24.5.1984 and finished her work on 17.6.1984.

The working programme was thoroughly prepared and arranged by the Chairman of EIRDC Dr. ElHadidy after consultation with Mrs. Muna Hatata UNDP Cairo. ( Annex 2 ).

Several lectures were presented dealing with topics ( Environmental Effects on Elect. Eng. Equipment " ( Annex 3 ).

Visits of EIRDC laboratories as well as training of environmental laboratory staff were organized in EIRDC during the stay of consultant.

Several visits of industry plants laboratories and technical works and organizations were organized in order to make consultant acquainted either with environmental effects problems or with results of EIRDC work ( Annex 4 ).

Introduction :

The climate in Egypt can be characterized as the arid tropic climat with high temperature of air which exceeds  $40^{\circ}\text{C}$  for several hours per day during the summer. The sand and dust (sand-storms) are very frequent in spring season.

Some parts of the country, close to the sea shore are humid, influenced besides it by salt pollution sand and dust.

In spite of that the majority of country is covered by desert, due to the high absolute contents of water vapour in air  $14 \text{ g/m}^3$  ( $8 \text{ g/m}^3$  in Europe) and rapid temperature changes dew point is reached on out door equipment also in area relative far from sea.

The high ambient temperature, disregarded in many cases by foreign suppliers as well as high density of dust, cause many failure on electrical equipment (accelerated aging malfunction of contacts) so that the reliability and technical life of many electrical and electronic equipments is reduced.

The pollution by dust and sand combined with industrial and agricultural pollution ( $\text{SO}_2$   $\text{NO}_2$ ) in combination with high humidity involves many difficulties on electrical equipment in open air (flash over on high voltage insulators, heavy corrosion damages, abrasion damages etc...).

Many of problems with electrical equipment caused by harmful climate of Egypt must be mastered by own power of

research and development centers in Egypt.

- Severe climatic conditions must be taken in consideration in process of designing ,selection of materials and components of new products, repairing and modernization of existing technical equipment for all industry branches.
- The testing facilities for environmental testing must be completed and national standards for "Environmental testing of electrical equipment " based on international recommendations IEC must be step by step elaborated and became binding for all electrical products in Egypt .
- The products imported to Egypt have to be checked concerning their resistance against climatic factors in country.
- The technology designed for import has to be proved in advance if suitable for local harmful climate. The supplier must be informed properly about the climatic conditions which can endanger the technological equipment and final products.

The EIRDC can hold the decisive position in this field of activity being already the only institution equipped - although very modestly - for environmental testing.

Besides, the EIRDC staff has to face often the failures of electronic equipment caused by severe climatic conditions in industry, which is a good opportunity to collect practical experience and knowledge in this field. These direct experience completed by results of environmental laboratory testing will create the basis for future development of activity in this field.



The present activity of EIRDC :

The main activities of EIRDC at the present time are mainly in industry services (economical effects see annex 5).

1- The EIRDC laboratories carry out services including repair, modernization and development of electronics meeting the needs of industry in either urgent or long-term perspectives.

In many cases it is necessary to develop the whole new electronic equipment or system to replace the old one which was based on unavailable components, because these components are either out of date or are not available in the local market.

2- EIRDC surveying the market to detect the needs and requirement of general purpose equipment that have the most effective impact on development of the country, taking into consideration the use of locally available materials and resources.

As an example of this activity, the EIRDC developed: stabilizer, timer, and battery charger.

3- " Universal controller based on microprocessor " is under development with the purpose to replace the out - dated control system in the factories and to enable modernization of many industry branches with the aim to increase the productivity and to improve the quality .

It will be also possible to equip the new factories with this local manufactured equipment to save foreign currency.

EIRDC decided to use the microprocessors-based equipment because of the many advantages of microprocessor which gives to this technology precisely those characteristics that make it appropriate for use, particularly in developing countries. By putting the computer power of a computer on a chip which is available cheap and easy to use, plus the software programming capability, microprocessor utilization comes well within the reach of developing countries.

- 4- EIRDC has printed-board manufacturing laboratories. That enables the execution of the printed circuits for EIRDC development and design work.

Besides the excess capacity is used to supply printed circuits on a small scale for industry. Example: for the time being EIRDC produces printed circuits of a telephone set required by the telephone factory in Egypt.

The environmental resistance of the developed or repaired equipment was not sufficiently followed till the present time by EIRDC laboratories, because of insufficient experience and poorly equipped environmental laboratory.

- 5- However the equipment for environmental testing is not sufficient for all necessary types of testing, some of basic testing can be carried out. The laboratory staff is very active in providing all available documentation dealing with the topic. Most of international recommendations concerning environmental testing was prepared to be discussed.

The care has been taken of testing equipment, so that the equipment was ready to be set in operation.

The first considerable environmental testing on about 12000 special units ( encapsulated printed circuits of ElNasr company for TV and Electronic has been started as the service for industry.

The number of tested units will reach about 96 000 during next two years.

The testing procedure meeting the individual requirement was already elaborated by the leader of environmental laboratory with the help of consultant, and was accepted by customer.

The future work of EIRDC :

Is ensured both by Government and by new elaborated project (UNIDO PROJECT DP / EGY /78 /003 ). In fact the future activity of EIRDC is the continuation of present - day activity on higher technical level and strengthened activities in the field of the development and implementation of local electronic equipment based on modern microprocessor and microcomputer technology .

Besides the intention of EIRDC in the near future is to enter the field of solar energy (solar-cells ) because the sunny Egypt is very suitable for such activity . This suitability is not only because of the available sun radiation around all the year, but also for the need of remote energy generation to cover activities in the vast desert areas such as water-pumping, water-desalination, etc.

During the realization of the third phase of project . the harmful effects of environment must be systematically followed. The environmental resistance of equipments must be incorporated into the developed product with respect to the all effects which can influence the equipment during transport , storage and operation. These effects: high temperature, Quick changes of temperature , corrosive atmospheric compositions ( salt mist SO<sub>2</sub>, dust as well as human factor etc), must be taken into consideration by the following :

- Design of equipment
- Selection of suitable materials, components and their protection

- Selection of proper technology, circuits and whole equipment.

Each prototype has to be tested by environmental testing methods suitable for given purpose.

Particular attention has to be paid to the selection of imported components because many of them are not suitable for certain areas of Egypt ( e.g. where long period of high humidity occurs during the year, such as Alexandria area).

If the development of electronic equipment ( design- ing , technology, ...etc ) is made locally in Egypt, there is more hope that those electronic equipment will be adapted to local environment better than many of those from abroad.

Equipment for environmental testing :

EIRDC is well equipped with sophisticated electronic instruments needed for services and development of electronic equipments .

There is very poor equipment for environmental testing, Only following tests can be carried out :

Dry heat- cold

Damp heat , steady cyclic and accelerated

Salt mist

Vibration (Simple equipment, damaged during transport)

Shock test

Conclusion :

The industrial growth of the country has reached the stage when sophisticated equipment are used in the majority of industry branches and this trend will continue in the future.

Electrical and electronic device based on microprocessors are included in these equipment.

Failure of electric and electronic equipment cause the production stoppage or products quality deterioration.

The considerable number of these failures are caused by severe environmental conditions in Egypt, disregarded very often by supplier and in many cases also underestimated by users, who are living in this country.

The average temperature in arid tropic areas is  $15^{\circ}\text{C}$  higher than in mild climate and reaches sometimes  $45-50^{\circ}\text{C}$ . If this fact is not taken into account, the electrical and also some of the electronic equipment will be overheated during its operation, that leads to accelerated ageing of insulating materials and shortening of the technical life. Each of about  $10^{\circ}\text{C}$  over the permissible operational temperature will reduce the technical life to 50% of their assumed value.

This well known fact causes considerable economical losses for customers as well as for national industry.

When, for example, the electrical equipment **originally** designed for mild climatic zone, where the temperature

seldom exceeds 25 - 27<sup>o</sup> C is imported to Egypt, its technical life will be probably reduced to 70 % of its originally expected life in Europe.

Considering that yearly imported electrical and electronic equipment, which is not controlled from the point of permissible operational temperature, reaches 100 000 000 LE, the economical losses is possible to be estimated at about  
30 000 000 LE.

However, this fact, which was physically proven a long time ago, can be discovered in operational conditions only by statistical methods. The high ambient temperature is only one of many factors. In a similar way can be evaluated the harmful effect of high humidity and salt mist accelerating the corrosion processes on metallic parts of equipment. The high humidity also involves the moisturing of insulating materials leading very often to the breakdown. High density of the dust causes the many failures on electrical contacts, sedimentation of dust decreases the cooling capacity, strong solar radiation is responsible for deterioration of rubber and some plastic.

According to the results achieved through investigation of failure reasons on electrical and electronic equipment in humid tropics, severe environmental conditions cause about 35% of whole number of failures frequency on electrical and electronic equipment supplied to the country without regarding the climatic conditions.



Considerable services were provided in last years by EIRDC staff to industry where the maintenance departments are often helpless.

Because of following:

- It is not their main field of specialization.
- Important documentation such as service data and circuit diagrams are usually missing.
- Spare parts needed for service are unavailable.
- Many industrial fields such a textil food and others are till now not aware of the importance of the role of electronics in the machines.

Service activity of EIRDC proved to be the most perspective one , also especially because either repair or development of deteriorated electrical equipment or its parts will be carried out with respect to the environment. This fact will avoid in many cases the repetition of the failure, which has been caused by harmful conditions.

Also during the design of a new equipment developed in EIRDC, the environmental conditions will be regarded through step-by-step collected knowledge and testing results, so that the equipment will meet the local environmental conditions and will be operating reliably during its required technical life.

This new activity which is developing in EIRDC will support the main activity of EIRDC to aware and to serve the industry in field of electronic and control and to assist the industry to build their own capabilities in the field of electronics in the future.

Recommendations :

The basic recommendations are as follows:

- To complete the environmental testing laboratory to be able to complete testing procedures according to IEC TC 50 recommendations.

The following new equipment have to be purchased step by step for this purpose.

Dust test chamber which enable systematic testing with regard to deposition or penetration of dust ( 800 litre - 20 000 \$ ).

Corrosion Gas climatic test chamber which enable systematic testing in corrosive gases SO<sub>2</sub>, No<sub>2</sub> etc., ( 100 litre - 5000 US\$ ).

Sunshine radiation device , which enable the testing of surface resistance of materials exposed to solar radiation ( 100 litre - 15 000 US\$ ).

Accessories , small instruments for measurement of temperature, humidity, solar radiation, dust density etc. ( 10 000 US\$ ).

- To adapt the enviromental testing procedures IEC TC 50 and 75 as a National Standards binding for all industry branches.
- To elaborate step by step the " relevant national standards " for environmental testing of single groups of products in order to **prove** environmental ability as a part of quality testing of products and equipment

designed for local market as well as for export. Also imported goods must be tested. The "relevant national standards" are including the set of sequences of testing procedures degree of severity of test and criteria for results evaluation related to type of equipment, its location and position during transport, storage and operation. Also other demands concerning degree of resistance against environment. There are existing many documents which can be followed as example in CMEA Standards (a part of them has been already given by consultant to staff of EIRDC environmental laboratory).

- The EIRDC environmental testing laboratory has to be authorised for duty environmental testing of products and equipment designed either for local market or export with power of attorney to issue the certificates concerning products ability for function in certain environmental conditions.
- The out-door testing station has to be build up for testing of resistance and durability of materials, coatings various kind for surface protections against harmful climate in Egypt.

The station has to be located in areas where all harmful effects of local climate influence the exposed articles ( sea salt, sand, dust, sunshine radiation ). That consequence of harmful effects can not be modelled in testing device. Therefore, out -door testing stations are very important for long-term testing

durability of materials and coatings. Accordingly it is possible to readjust the testing results of laboratory testing . Economic use of that testing station is viable.

- To establish a council of industry and research representatives who has to discuss and propose the measures concerning " Protection of technical electrical and electronic equipment against environmental effects in EGYPT " .Aims of this activity are clear from the following examples :
- 1- Improving the environmental resistance of local products in order to lengthen their technical live and also to increase their attractivity for foreign market. in other severe climatic conditions (humidity, dust, etc.).
- 2- To formulate the demanded specifications of imported technical electrical and electronic equipment concerning the climatic resistance.
- 3- To propose the measures for control of imported technologies to Egypt if suitable for local environmental conditions in order to ensure in advance the suitability for local environmental and other prevailing specific conditions .
- Lectures concerning the basic knowledge about the harmful environmental effects on technical electrical and electronic equipment have to be read during each training course organized by EIRDC, in order to disseminate the knowledge concerning this topic to industry workers.

- It is necessary to call the tripartite meeting as soon as possible in order to clear all the necessary matters and to arrange it regularly every year as usual , during the project realization.
- The third phase of the project has to be approved as soon as possible and completed by paragraphs concerning the environmental activities of EIRDC . It is necessary to revise the project budget, because the project document has been elaborated in early 1982, regarding the level of expenditures and prices of that time .

It is recommended to increase the project budget of the following items :

Expected price-increase ( about )	230 000	US\$
Equipment for environmental testing	60 000	US\$
Abroad training in field of environmental testing 6m/m	18 000	US\$
	-----	
	308 000	US\$
The original grand total	565 000	US\$
The new total sum equals	873 000	US\$

- In order to avoid the difficulties caused by long-term delivery also of small items , it is necessary to enable the placement of " Field purchase orders ". Besides it is necessary to ensure the direct purchasing of small spare parts for certain amount of cash money.

UNITED NATIONS



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

Project in the Arab Republic of Egypt

**JOB DESCRIPTION**

DP/EGY/78/003/11-06/31.9.C

**Post title** Expert in Environmental Testing of Electrical and Electronic Equipment

**Duration** One month

**Date required** November 1983

**Duty station** Cairo

**Purpose of project:** To assist the Egyptian General Organization for Technical Electrical and Electronic Industries and its electronic companies in the development, improvement and expansion of the electronics industry.

**Duties** The expert will specifically be expected to assist EIRDC in environmental testing of electrical and electronic equipment and components and training. Testing and training programmes are related to the following:

- 1) Effects of climatic conditions on functional properties and reliability of electrical equipment;
- 2) Fundamental problems in the design and construction of electrical equipment for the tropics;
- 3) Selection of insulating materials and construction materials;
- 4) Diagnosis and life-time forecasting;
- 5) Production technologies for a tropical environment (for a number of selected products);
- 6) Climatic testing and indices for evaluating the life-time in a tropical environment;

.... / ...

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Applications and communications regarding this Job Description should be sent to:

Project Personnel Recruitment Section, Industrial Operations Division  
UNIDO, VIENNA INTERNATIONAL CENTRE, P.O. Box 300, Vienna, Austria

- 7) Effects of tropical conditions on the reliability of electronic equipment;
- 8) Selection of materials and components;
- 9) Design of electronic equipment for tropical environment;
- 10) Climatic testing of electronic equipment and indices of tropical climatic resistance.

The expert will also be expected to prepare a final report setting out the findings of the mission and recommendations to the Government on further action which might be taken.

Qualifications

Technical degree, with wide experience in environmental technology with emphasis on protecting electrical, electronic and power engineering equipment from corrosion; experience in severe tropical environments in the selection and testing of materials, test equipment selection and specification and implementing anti-corrosion protection programmes.

Language

English (Arabic an asset)

Background Information

Confronting the growing Egyptian industries, it was necessary to establish a laboratory for environmental testing. EIRDC had received quality control equipment required to study the different environmental effects, such as heat, cold, humidity, corrosion, vibration and shock, on the industrial products. The principal objective of the environmental laboratory is to improve environmental resistance of domestic manufacturing facilities, domestically produced products and imported products.

(It is worth mentioning that the climate in some places in Egypt is to be considered as tropic arid or desert climate.)

Time table of daily activity of consultant:

- 24.5. Briefing by UNDP Cairo; introduction to EIRDC
- 27. - 28.5. Work at EIRDC: preparation for a lecture
- 29.5. Lecture given at National Research Centre, Cairo
- 30. - 31.5. Work at EIRDC: training of environmental testing laboratory staff
- 1.6. - 2.6. Visit of HV distribution station and overhead lines in Port Said and Damietta areas
- 3.6. Training of EIRDC staff
- 4.6. Visit of HV laboratory, testing station of HV insulators and solar cells power station
- 5.6. Meeting with Ministry of Electricity
- 6.6. Work at EIRDC
- 7.6. Visit of factory for transformers and discontinuing switchers; visit of Section of Quality Control and Institute for Quality Control
- 8. - 9.6. Weekend
- 10.6. Visit of UNDP office: discussion with Mrs. Mona Hatata
- 11.6. Visit of Ministry of Industry and Mineral Resources
- 12.6. Visit of General Organization for Industrialization, Cairo
- 13.6. Lecture given to EIRDC staff
- 14.6. Visit of UNDP office: discussion with Mr. Tharwat Sabri
- 15. - 16.6. Visit to Alexandria for investigating sea climate effects
- 17.6. Finalization of Terminal Report



Lectures and Training :

- Environmental factors affecting electronic and general engineering equipment.
- The classification of environmental condition for electronic electrical and machinery industry  
( The National Research Center Cairo )
- Philosophy of environmental testing of electrical and electronic elements and equipment.
- Choice of testing sequences and severities of testing in relation to the actual operational conditions.

( Electronic Industries Research and Development Center Cairo ) :

Elaboration of relevant documentation to the basic environmental testing procedures for different types of equipment.

Selection of materials and elements suitable for production of electronic device in conditions of EGYPT

Evaluation of testing result after environmental testing .

( Electronic Industries Research and Development Center-staff of environmental testing laboratory-daily training and discussions )

Visits :

- 1- Electric distribution stations in the Area of Port Said and transmission lines in the area of Damietta.

High voltage transmission lines are suffering by salt dust and sand pollution. The salt, either in cristalin state or as a spray, is sedimenting on the insulators and on metallic parts (pins and tower) together with dust particles. The sedimented layer on insulators surface leads to flashover. This phenomenon occurs especially during the rapid change of temperature when dew point is reached. The metal parts are destroyed by heavy corrosion. The rapid corrosion is accelerated by abrasion of coating due to flying sand moved by strong wind, which gives the particles a considerable kinetic energy.

- 2- The Pyramids Electrical High Voltage Research Center, Cairo  
The testing laboratory for high voltage heavy current electrical equipment.

E.EL SHARKAWI M. MORSI and others

The problem concerning the difficulties caused by dust sedimentation on insulators has been discussed with the Chairman of laboratory and his staff. Several kinds of high voltage insulators are exposed to open conditions near the laboratory in order to be tested how they resist to the climatic conditions.

Ceramics, ceramics protected by silicon grease, glass, silicon rubber - different shape insulators are exposed in various

heights for certain number of months, or some of them also for several years. The dust sedimentation is measured and tested from the points of electrical resistance against flashover.

The glass insulators are considered as the best for those conditions, while the semiconductive glassing and silicon grease protection is not effective. Silicon rubber insulators are not enough resistant against flying sand that damages their surface by abrasion.

The composition of sedimentations has not been investigated. However the country is considered as the arid tropics, the rapid changes of temperature and considerable high water vapour content in air  $14 \text{ g/m}^3$  leads during long time of the year to dew point, also in Cairo and its surrounding. The dew point is reached at about  $16^\circ\text{C}$  in Egypt. Due to the considerable heat capacity of insulators and of the tower, their surfaces stay wet for a long time during the air-temperature raising in early morning. The corrosion of pins was observed, and in relatively short time the corrosion of pins causes fall-down of insulator.

3- The solar radiation station has been visited. It is used for water desalining. Solar cells were covered by dust. The representative of the supplier said that such quick intensive dust sedimentation was not supposed. These conditions will influence the system and lowers the efficiency of solar cells.

The laboratory welcomed the initiative of EIRDC to study the environmental effects on electrical equipment, and EIRDC is ready to cooperate.

4 - Ministry of Electricity :

- Dr. Emad ElSharkawi, General Technical Director
- Dr. M. Awad, Technical Director

and seven other engineers

After a brief introduction and explanation of the consultant's activities, as well as the activity planned in EIRDC concerning the testing and protection of electric and electronic equipment against severe conditions in Egypt, the very active discussion started moving. All participants welcomed the activity of EIRDC and were ready to support it by means of active co-operation. Several examples of harmful effect of Egyptian climate in the use of electrical equipment were demonstrated. The consultant was asked many questions concerning protection measures. Some questions were very special, e.g., effect of decompositions of  $SF_6$  in arc, problems of cables coating by crosspolyethylene exposed to high temperature, etc. Many of these questions were cleared on the spot and only one needs yet to be thoroughly considered with the help of data which was not available on the spot. The very active and long discussions showed that careful and urgent attention to this field of activity of the Egyptian industry was necessary and needed to be followed systematically.

5- General Organization For Industrialization Cairo:

Eng. Abdel Moneim A. AlMehelmy ,Deputy Chairman

After the briefing, Mr. Mehelmy pointed out the following: the activity of EIRDC is very important ,even it is of big value for national industry. The prompt help of EIRDC in industry plants avoided many stoppages of production. The servicing and development of electronic sophisticated control equipment and systems is badly needed in the country which is still somehow dependent on abroad facilities for production and maintenance of sophisticated equipment.

For example , there was the danger of stoppage of a great capacity cigarettes machine, which could be avoided by prompt action of EIRDC . Like the lack of any other daily-needed goods in the local market, the lack of cigarettes influences the opinion of the people.

The new activity of EIRDC in the field of environmental protection of electronic and electric equipment proves that the leaders of this institution are very progressive to estimate not only the present but also the future and broad needs of industry.

"We have to work in the interest of our country and to give all support and services to our industry and economy for the welfare of our people", Mr. Mehemi commented.

6 - Factory for Transformers and Section of Disconnecting

Switches Production :

Mr. Ahmed Tayel, General Technical Director  
and others

Oil transformers 11 KV/400 V 250 - 1000 KVA are produced in one part of this factory. The transformers design was made in co-operation with a FRG company. The ambient temperature of 50°C in the shade has been taken into consideration. The transformers are provided by silicagel moisture protection. The environmental effects are not followed during the operation. Quality of oil is not checked. The failure occurs mostly as a breakdown of primary insulation winding.

The transformers sent for repair to the factory were damaged by very heavy corrosion of the surface, especially of welding seams.

All care concerning further protection against climate (i.e., cleaning of insulators in the majority of areas, very frequent repainting of tanks - every two years - ) is - according to the opinion of the producer - the matter of users.

Disconnection switchers produced in other work of this company are - considering the climate in Egypt - of high quality meeting the demands of severe environment in this country. The leaders of the company welcomed the interest of EIRDC and they agreed to co-operate especially in the field of failure reasons of transformer-insulation and in the field of surface protection of transformer tanks.

7 - Section of Quality Control, Ministry of Industry and  
Institute for Quality Control

A.A.K. Selim, General Director of Section of  
Quality Control, and others

A brief survey was given to the consultant. The testing institute for quality control is under construction. It is supported by a UNIDO project. The departments for metrology, quality control of food, materials as well as for household electrical appliances are in operation. The department for electronic and electrical equipment testing is still not fully equipped. Due to the low income of the employees in comparison with private sector companies, an alarmic braindrain exists in this institution.

The equipment for environmental testing is needed but not available. The institute for quality control welcomed the co-operation of EIRDC in this field, because there seems to be little hope that the environmental testing could be carried out in the quality control institute in the near future, due to lack of equipment and skilled staff.

8 - The factory for TV production - ElNasr Company for T.V.

A. Hamdi, Chairman  
and others

The TV sets are produced according to the Japanese design and made of kits of Japanese components. Besides, some special products (such as transreceivers) are produced. The factory has no equipment for environmental testing which is needed for this specific production. Therefore, the help of EIRDC is extremely necessary to test this product, for the time being. In future, when the factory will be equipped for this type of testing, EIRDC will assist in this field as adviser. The first testing has been started on special encapsulated printed circuits. The first lot consists of 29 000 units. The required technical details and conditions of testing were agreed upon. The duration of the test with respect to the limited capacity of EIRDC testing equipment is estimated to last for one year.



9 - Ministry of Industry and Mineral Resources, Cairo

M. Sami Darwish Elyazi, Vice-Minister

After the briefing, Mr. Darwish cleared the following:

The work of EIRDC is very much appreciated in all fields of its activities. However, the training of industry workers is of very prime importance, but it should not be considered as the main activity of EIRDC. The most important and necessary task is the development of new electronic products utilizing the local material resources. The introduction of sophisticated electronics into industry in order to improve the productivity, quality and efficiency, can be considered as imperative to proceed with the world development and evolution in electronics.

The use of electronic control in Egyptian industry is delayed in comparison with developed countries, and the activity of EIRDC is to overcome this delay, which causes the slow development of industry. The new activity dealing with environmental protection of electronic equipment is to be welcomed to avoid unnecessary losses in all branches of industry and economy.

10 - UNDP Office

Eng. Tharwat Sabry

Mr. Sabry was briefed concerning the expert's activities. Mr. Hadidy asked him to hold a tripartite meeting in order to accelerate the approval of the third phase of EIRDC (UNIDO Project EGY/79/003). Mr. Sabry promised to arrange this meeting.

The main economical effects of EIRDC in the course of the year 1983

1 - Microelectronics Technology :

The big film technology laboratory was established and is already able to meet the needs of industry.

- The photo switcher based on the above-mentioned technology has been developed, and a small-scale production will start within several months. The switcher is designed for city street lighting and its application enables to save about 10% of the electrical energy needed for street lighting at the present time.

Economical effect (yearly) 4.000.000 LE

- If "know how" of this technology will be requested for the electronic industry from abroad, the cost will not be less than 11.000.000 LE.

EIRDC can offer such knowledge.

Economical effect 11.000.000 LE

2 - Services :

- The electronic control system of the main transformer-sheets-cutting machine in El Nasr Company transformer factory was put into function by EIRDC after overcoming the failure of some circuits and components of electronic control. This helped to avoid the stoppage of production which is estimated to be for two weeks (that is the usual time needed for foreign experts to arrive from abroad to repair and readjust the equipment).

Economical effect, reached through avoiding the stoppage of the factory, is estimated at 1.500.000 LE



4 - Training :

Through the servicing of factories, EIRDC builds-up a permanent connection with the industries. In many cases the problem was not only in the machine, but in the man-machine relation. Accordingly, the training of the technical staff was found to be of primary importance. For this reason EIRDC arranges specific training courses to upgrade the capability of the staff to deal with the modern machines, to realize optimum efficiency and productivity. For example, last year EIRDC organized and executed 32 training courses (18 general, 14 specialized). Those training courses are necessary because of the quick development and evolution in the field of electronic technology. The development is clear from the growth of training courses, trainers and beneficiaries.

The economical effect of training in industry is evident, but it is difficult to be evaluated exactly on money value. EIRDC and Government authorities estimated it approximately at yearly

15.000.000 LE

Total economical effect(yearly)

1 - Microelectronics technology	15.000.000	LE
2 - Servicing	30.000.000	LE
3 - Development	27.000.000	LE
4 - Training	<u>15.000.000</u>	<u>LE</u>
	87.000.000	LE
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