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Limited

E/CN.14/EP/INF/010

7 December 1973

Original: ENGLISH

**UNITED NATIONS
ECONOMIC AND SOCIAL COUNCIL**

ECONOMIC COMMISSION FOR AFRICA

Regional Symposium on the Training
of Personnel (at all levels)
for Power Production and Distribution

Addis Ababa, 10-20 December 1973

TRAINING OF PERSONNEL IN THE NIGERIAN SUPPLY INDUSTRY

(Document prepared by the Federal Ministry of Mines and Power, Lagos)

E73-2887

TRAINING OF PERSONNEL IN THE NIGERIAN SUPPLY INDUSTRY

Adequate sources of power and a reliable system of transmission and distribution network are essential to a Nation's economy, security and standard of living. To achieve these objectives therefore, not only must the system be constructed with durable materials commensurate with safety, but the power Managers and Operating personnel at all levels must be trained in up-to-date methods to increase efficiency with a view to ensuring continuity, higher productivity with the attendant favourable returns on the initial capital outlay.

2. In the Nigerian context, the major Electricity Supply Company is the National Electric Power Authority (N.E.P.A.) which emerged recently from the amalgamation of the former Electricity Corporation of Nigeria and the Niger Dams Authority. While NEPA enjoys an almost unlimited monopoly holding sway in all parts of the country, other producers/distributors do so only under special agreements and licenses granted by the Federal Ministry of Mines and Power. Such is the case with:

- (a) the Nigerian Electricity Supply Co. (NESCO) which with an installed capacity of 25 MW (mainly hydro) was established primarily to meet the demand of the alluvial tin mines of the Jos area of the Benue-Plateau State;
- (b) the African Timber and Plywood Co. which produces electricity from waste wood fired boilers almost exclusively for its own use in the Sapele Town of Mid-Western State;
- (c) the Nigerian Sugar Company at Bacita, Kwara State, which generates electricity from bagasse fired boilers;
- (d) some oil prospecting companies notably Shell-BP and Mobil which run gas turbines in the Delta Areas to feed oil drilling rigs and ancillary equipments.

Mention must also be made here of the States' Rural Electricity Boards now being set up as a means of stimulating rural economy and of controlling the drift of population from the rural areas to the urban centres. Since most of these companies and boards are comparatively young coupled with the fact that some of them recruit experienced Ex-E.C.N. officials, training programmes as practiced or are being practiced in the then E.C.N. and its successor the National Electric Power Authority respectively would adequately represent the true condition of vocational training in Nigeria.

3. Training Programmes Adopted in the Former Electricity Corporation of Nigeria (E.C.N.)

(a) Historical Background

When the Corporation started operations in 1951, it inherited, among other things from the Nigerian Government, the J.T.S. (Junior Technical Staff) Training Scheme. The Scheme which was introduced in the early forties was designed to produce the grade of technicians in order to provide that essential link between the professional engineers and the craftsmen, tradesmen or artisans. For this purpose, Grammar School leavers who had acquired the School Certificate with passes in the relevant science subjects and mathematics were selected and sent to the Technical College or Institute (Higher College, Yaba up to 1947) for a sandwich type course lasting about 3 years at the end of which period successful ones were appointed to the Technician Grades of Assistant Technical Officers and Technical Officers.

This remained the only regular and organized training scheme operated by the Corporation until about 1958. About this time, the Corporation felt the need for efficient supervisory staff in the Technical Grades and it was decided to organize formal training for suitable members of the junior technical staff. A small school was improvised at Ijora and later moved to temporary sheds, loaned from the Nigerian Army, at Maye Street, Yaba. Mixed classroom and on-the-job training were adopted for this type of training which provided the corporation with a number of supervisors.

In 1962, at the corporation's request, the United Nations Organization sent one Mr. Enar Eskillson to investigate and report on the Corporation's manpower and training requirements to meet the expected expansion plans of the Corporation. The report was submitted in 1963. In 1964/65 under the general managership of Mr. Y.S. Sun, the Corporation negotiated and acquired a 15 acre piece of land near Oshodi (9 miles from Lagos) for the purpose of establishing a training centre. Early in 1966, the Corporation arranged with J.G. White Engineering Corporation of New York under the U.S.A.I.D. Technical Assistance Scheme to provide it with Training Services for about two years. The programme consisted of the provision of field staff of six specialists who helped to set up an organization, assisted and advised in the operation and maintenance, and trained certain personnel for the high tension grid system. Also about forty-five employees of the Corporation were sent to the U.S.A. where they were given classroom instructions as well as on-the-job training for a number of weeks. Further on-the-job training was arranged by the J.G. White specialists for them on their return home in Nigeria.

The forty-five members of staff trained were drawn from different categories of workers comprising the following:-

- 4 Substation Supervisors
- 8 Substation Maintenance men
- 4 Load Dispatchers
- 24 Substation Operators
- 3 System Operation Engineers
- 2 Relay Engineers

Generally for the professional grades, the Corporation adopted the system of awarding scholarships and study bursaries to deserving members of its staff and also recommended under-graduates at local universities. In addition, Corporation staff were sometimes sponsored, nominated or released for Federal and State Government awards. Also under Mr. Sun and Mr. C.F. Hsu who succeeded him Middle and Top management were for the first time, given opportunities to attend formal courses and seminars in management, both locally and abroad.

(b) Functions of the Department of Training

In order to cope with the numerous activities in the field of training, management created a Training Department under the Head of the Administration Division i.e. the Assistant General Manager Administration. This department was responsible for the following functions:-

- (i) Detailed planning, organisation and administration of the Training Centres, including the provision of adequate and competent instructors.
- (ii) Planning of manpower requirements and identification of the training needs in all fields of the Corporation.
- (iii) Preparation of training manuals and other necessary training aids.
- (iv) Advice on the formulation of training policies and objectives.
- (v) Arrangements for overseas training and practical course attachements.
- (vi) Close contact with training and educational institutions, both at home and abroad to ascertain the range and quality of courses available.
- (vii) Organization of seminars and similar courses for management and supervisory development.
- (viii) Evaluation of the improved performance of trainees after training and to ascertain the effectiveness of each training class. Such feed-backs were used as guides for improvement of training methods and techniques.
- (ix) Organisation and conduct of trade test, electrical efficiency bar tests, etc., as required.

- (x) Any other related functions that may be assigned to it by the General Manager from time to time.

N.B. All these were subject to periodical review.

4. Training Policies and Objectives

The policies were that:-

- (a) Training shall be one of the Corporation's important routine functions as well as one of its top priority activities.
- (b) Training will be concentrated on the Corporation's existing junior staff which made up more than 95% of the total staff. Highest priority will be given to the first-line supervisors, such as the foreman class of junior staff.
- (c) Training will be "intensive", "highly specialized" and "practical" but of short duration. However, it will be repetitive through progressive re-training.
- (d) Training will include "attitude corporation" and "discipline enforcement" features.
- (e) In order to make training more effective, various incentives will be offered through competitive tests.

The above policies were aimed at achieving the following objectives:-

- (a) To raise the performance standards of the Corporation's junior and senior staff through intensive training.
- (b) To ensure adequate supply of trained staff in all fields of operation, both in the junior and senior cadres.
- (c) To secure effective enforcement of discipline and adoption of correct attitude through training.
- (d) Progressive improvement of training techniques and methods through evaluation of trained personnel as well as through research and development.

4.2. Categories of Workers to be Trained:-

The following is a list of Professionals, supervisory personnel, technicians/artisans and non-technical junior service staff who are in need of training in order to improve the quality of their performance:

A. Supervisory Personnel

- (a) Supervisors
- (b) Foreman
- (c) Crew-Leaders
- (d) Gang-Leaders

B. Technicians and Artisans

- a) Steam Plant Attendants/Operators
- b) Gas-Turbine Plan Attendants/Operators
- c) Power Station Attendants (Diesel)
- d) Power Station Roving Crew -
- e) Engine Drivers and Greasers (Diesel)
- f) Switch Board Attendants
- g) Substation Attendants (Battery Attendants)
- h) Substation Roving Crew
- i) Line Patrolmen
- j) Linesmen-Transmission
- k) Linesmen-Distribution (Faultsmen)
- l) Linesmen-Construction
- m) Equipment Erectors (Riggers)
- n) Cable Jointers
- o) Surveyor Assistants (Chairmen)
- p) Meter Readers/Fixers
- q) Draughtsmen
- r) Testers/Mechanics
- s) Electrical Fixers
- t) Mechanical Fixers
- u) Vehicles Mechanics
- v) Instrument Mechanics
- w) Plumbers, Welders, Wiremen, etc.

C. Non-Technicians

- a) Accounting Assistants
- b) Personnel Assistants
- c) Store Attendants
- d) Billing Clerks
- e) Card Punchers (for Computer)
- f) Secretary Assistants
- g) Typists
- h) Telephone Operators

D. Pupil Engineers and other Professionals

4.3. Review of Manpower Position

In 1971, the Corporation had a total of 8,352 employees of which 5,800 were permanently established junior service, 2,200 were daily paid and 352 were of senior service grade. Of the 352 senior service employees, there were 40 expatriates, 159 engineers, 40 accountants, 41 senior technical officers, 20 Higher Technical Officers, 9 Commercial Officers, 26 Personnel and Administrative Officers and 17 Secretariat staff. A review was conducted as a result of which it was realized that there had been over-staffing and under staffing in the junior and senior segments respectively the ratio being in the neighbourhood of 1:24 instead of about 6:12 as expected of an

organization of that size. The Management then formulated the following Manpower Scheduled up to 1973/74.

Manpower Planning Schedule
Estimated Manpower Requirement up to 1973/1974
(June, 1971)

	Junior Service		Senior Service			
	P.E.	D.P.	Engrs	STO/HTO	Accts	Others
1971/72	5,800	2,200	159	61	40	52
1972/73	5,500	1,800	210	90	50	55
1973/74	5,300	1,600	260	120	60	60

5. New Training Centres:-

Due to the numerous activities the Corporation must undertake in the field of training, the Management decided, with the approval of the Board, in 1966 to build two Training Centres, one at Oshodi and the other at Kaduna.

5.1. The Oshodi Training Centre

The centre was to be fully residential and capable of accommodating up to 200 trainees at a time. The Administrative block, classrooms, workshops, hostels as well as the recreational facilities were estimated to cost about N1,000,000 (£500,000) to erect and equip. The progress of this scheme which started in 1966 was delayed by the 1966-70 national crises. The scheme which was to have been re-started after the civil disturbance had now been shelved by the new Management of NEPA which have adopted a different system as will be seen later under the NEPA training scheme.

5.2. The Kaduna Training Centre:

A training centre has been established at Kaduna to provide training facilities mainly for diesel power station staff such as Power Station Attendants, Engine Drivers, Switchboard Attendants, Diesel Fitters and Mechanics. The aim was to ensure the supply of efficient operation and maintenance staff for the large number of isolated diesel-driven power stations in the Northern States. The total cost of erection was estimated to cost N400,000 (£200,000). The Kaduna Training School is still operating under NEPA.

6. Training of Pupil Engineers and Other Senior Staff

By standards of the reputable Engineering Institutions of the World, a graduate in engineering is not accepted as a professional engineer until he/she has undergone organized industrial training for a period of about two years. Now that our local universities are producing graduates in engineering it has become necessary for the Corporation to organize the required graduate apprenticeship for these graduates who join the Corporation. The programme lasts two years and follows generally the pattern recommended by the Training Committees of the Institutions of Electrical and Mechanical Engineers of Great Britain. There were three basic parts, namely:-

- (a) Basic workshop training
- (b) General Electrical & Mechanical Training
- (c) Directed Objective Training

Apart from scholarships for formal technician or professional training, the Corporation encouraged its senior management staff to utilize part of their annual leave periods to attend courses relevant to management or to their particular lines of specialisations. In this regard, the Corporation arranged short - duty attachments with power supply organizations abroad. The Taiwan Power Company, the Detroit Edison Company of U.S.A. and the British Electricity Council have been very co-operative in this regard. Seminars run by the local Universities and the Nigerian Institute of Management were also patronised where appropriate. Technical Assistance training offers were also utilized where appropriate and convenient. According to the Corporation's 1970 Annual Report, statistics of personnel being trained are as shown in Annexes III & IV.

7. STAFF DEVELOPMENT WITHIN THE NATIONAL ELECTRIC POWER AUTHORITY

At its inception, the management of the new National Electric Power Authority inherited a number of problems such as unifying the engineering and accounting services of the defunct E.C.N. and N.D.A. Nevertheless it realises that a sound and comprehensive programme for the education and training of qualified personnel on its establishment is essential not only to fulfilling its own manpower requirements but also to that of the country. As the industry and commerce expand, the demand for power mounts and the need for management, professional and technical training of the Authority's staff increases. To cater for this need, the Authority has undertaken a wide ranging training programme covering all facets of the Authority's business.

8. The training of the Authority's staff can be classified under the following headings:-

- (i) In-House-Training i.e. training within NEPA.
- (ii) Making use of existing Nigerian Institutions of higher learning.
- (iii) Attachment to reputable firms for requisite industrial experience.

8.1. Under 7(i) above, the Oshodi training school envisaged under the E.C.N. has now been shifted to Ijora very close to the machine shops. Here, courses are run to train electrical operators, electrical maintenance personnel, thermal plants operators and mechanical maintenance technicians. At Kainji, the training school used by the N.D.A. during and after the construction of the dam has now been revived to provide the much needed line maintenance and protection control technicians. Likewise at Kaduna, a small school for training diesel plants operators, mechanical maintenance technicians and fitters has been established. Between them the three training schools will have an average intake of 110 students of various types. The course which is a sandwich type will last at least a year.

8.2. In making use of the existing Nigerian Institutions of higher learning, the Authority has evolved a system whereby a number of deserving personnel will be given the opportunity of pursuing their professional and degree courses. To this end, the Authority is sponsoring twelve students a year at some of the Nigerian Universities and colleges of Technology. For example:-

- (i) Six students are at present completing their professional degree courses in accountancy at the Yaba College of Technology.
- (ii) Five students are at the University of Lagos studying Business Administration.
- (iii) One student is at the Nigerian Institute of Journalism training to be a journalist after the successful completion of which he may be absorbed into the Public Relations Department of the Authority.

8.3. In fulfillment of 7(iii) above, the Authority has entered into a 5-year training agreement with the Hydro Electric Power Commission of Ontario, Canada for the training and development of its staff. Courses are already being organized here in Nigeria by the Ontario Hydro Training Staff while overseas attachment are also run in parallel to this in Canada. For example, two of the staff are at present attached to the Ontario Hydro Electric plants in Canada. One is a station chemist from Ijora Power Station while the other is a graduate electrical engineer. Besides the Ontario Training Scheme, other suitable overseas attachments are being arranged with the General Electric Company of England (for manufacturing experience) and with the Area Boards through the British Electricity Council at Millbank in London. This is just the beginning and it is intended to increase the number of staff trained yearly to meet the acute shortage of manpower needs of the Authority. For the aforementioned attachments, the Authority places much emphasis on how to diagnose troubles and to effect repair rather than on acquiring more experience.

9. The Ontario Training Staff have been deployed throughout the system of the Authority as follows:-

(i) Finance Division

In the Finance Division, they are attached to the Assistant General Manager (Finance) and three other Heads of Departments for Staff development. Their duties include, among other things, training people on budgeting financial reporting and business system with a view to those trained taking over from them when they finally leave.

(ii) Stores

There is a manager of Central Stores whose job is to re-organise the whole stores complex. Under his supervision, a new central stores will be built at Oshodi with two sub-stores at Kaduna and Port-Harcourt respectively. The existing store depot at Apapa will be converted to a warehouse. In pursuance of the training of store personnel, a short training trip will soon be organized for three top stores assistants in Canada to enable them get acquainted with the methods being used there.

(iii) Central Workshop

There is a manager of Central Workshop whose duties are:

- (a) to train his successor and subordinates;
- (b) liaising with the new training school on workshop practice;
- (c) setting up a new workshop facilities.

(iv) District Supporting Group

There is an Adviser attached to the Assistant General Manager District (i.e. AG.M.D responsible for distribution throughout the country). The job of the adviser is to recommend the training of the staff in the Districts and to define the function of the Districts. For this purpose he will use two of the districts as model for development of his ideas.

(v) Engineering Department

Here there are two adviser-Heads of Department, attached to the Assistant General Manager Engineering. One is on power system planning while the other is the head of engineering design department. Under them are three engineers as follows:-

- (a) Engineer - Mechanical Design
- (b) Engineer - Electrical Design
- (c) Engineer - Protection Control and Communication Design.

(vi) As recommended by the Shawmount Report of Investigation into the supply Industry, a Corporate Planning Department has been created to do corporate planning. (See attached organization chart on Corporate Planning).

10. A brief summary of staff Training in NEPA is at Annexes I and II.

NATIONAL ELECTRIC POWER AUTHORITY

STAFF TRAINING

As Industry and Commerce expand, the demand for power mounts and the need for management, professional and technical training of the Authority's staff increases. To cater for this need, the Authority has undertaken a wide ranging training programme covering all facets of the Authority's business. The programme is outlined below:-

1. MANAGEMENT TRAINING

The Authority will continue to make use of training facilities provided by external organizations such as the Nigerian Institute of Management, the Universities, Technical Colleges, etc. In realization of the fact that some problems are peculiar to this organization, the Authority will, in addition, organize management seminars from time to time.

2. SUPERVISORY TRAINING

To increase the on-the-job effectiveness of the Authority's supervisors, it is intended to continue the monthly supervisory courses organized by the Training Department for technical and clerical supervisors of the Authority.

3. POST-GRADUATE TRAINING

There is increasing need for specialists and for the continuous improvement of existing management and professional staff. Selected Pupil engineers who obtained their academic qualifications in Nigeria will be sent abroad to factories manufacturing electrical equipment and public utilities for periods of six to twelve months in order to broaden their knowledge and experience. In addition other management staff and engineers will be sent abroad from time to time for management and specialists training courses and attachments of from three to twelve months duration.

4. TRAINING IN ACCOUNTING

Selected members of Accounts Staff who have, by their own private efforts or otherwise obtained sub-professional standards equivalent to part III of A.C.C.A., A.C.M.A. or A.C.W.A., will be given opportunities by means of scholarships to attend suitable institutions in the country, in the Authority's time and expense, in order to be professionally qualified.

5. TRAINING IN ENGINEERING & BUSINESS STUDIES

Staff who obtained qualifications equivalent to ONC/OND in Engineering and Business Studies will be given opportunities by means of scholarships to attend Technical Colleges in Nigeria in the Authority's time and expense to obtain higher diplomas.

6. SCHOLARSHIPS TENABLE IN NIGERIAN UNIVERSITIES

Management will award a few scholarships, annually, to deserving staff of the Authority to enable them pursue degree courses in the fields relevant to the Authority's needs.

7. TECHNICAL TRAINING

The Authority's technical training requirements are to be fulfilled with the addition of the new Training Centre at Ijora and revival of training facilities at Kainji. These centres will provide classroom training for six technically oriented groups. These are:- Line Maintenance, Electrical Maintenance, Mechanical Maintenance, Thermal Plant Operators, Electrical System Operators and Protection and Control Maintenance. To complement the classroom training, field units are being established to provide on-the-job training which is vital to an overall training programme. Candidates will be selected from within the Authority and will receive up to three year's classroom and field instructions. A large percentage of this will be field training in specially formed crews working on day-to-day problems on the power system.

TRAINING STATISTICS IN 1970

LOCAL TRAINING

Scholarship Award tenable in Nigerian Universities:

Only twenty-one students sponsored in the previous year still continued at the Institutions stated below:-

COURSES	UNIVERSITY/INSTITUTION			TOTAL
	Ibadan	A.B.U.	Lagos University	
Elec. Engineer	-	10	-	10
Mech. Engineer	-	1	-	1
Civil Engineer	-	1	-	1
Accountancy	-	2	-	2
Statistics	1	-	4	5
Computer Programming	-	-	2	2
Total	1	14	6	21

Training Awards in Technical Institutions:

Apart from 30 third-year A.T.O's undergoing practical training within the Industry, other 89 students studying in four Government Technical Colleges are detailed below:

COURSE	INSTITUTION/COLLEGE				TOTAL
	Yaba Col. of Tech.	Kaduna Polytechnic	Ibadan Tech. Col. of Tech.	Tech. Col. of Auchi	
O.N.C.	28	42	5	3	78
H.N.C.	1	-	-	-	1
Secretaryship	1	-	-	-	1
Lab. Technology	1	-	-	-	1
Accountancy	1	-	7	-	8
Total	32	42	12	3	89

Pupil Engineers

Thirteen Pupil Engineers recruited during the year were undergoing post-graduate training in the different facets of the Corporation's activities.

Training of Technicians:

The Corporation's crash programme had turned out successfully. Efforts were increased to improve skill and performance of the junior staff through the two Training Centres at Oshodi and Kaduna thus:

E.C.N. OSHODI TRAINING CENTRE

Trade	No. Retrained
Lines Construction	30
Cable Jointing	20
Electrical Fitting	21
Total	71

E.C.N. Kaduna Training Centre

Only 16 employees retained in Mechanical fitting, engine driving and greasing.

Kaduna Centre is now concentrating on the training of personnel required for the operation and maintenance of Isolated Diesel Power Stations.

OVERSEAS TRAINING

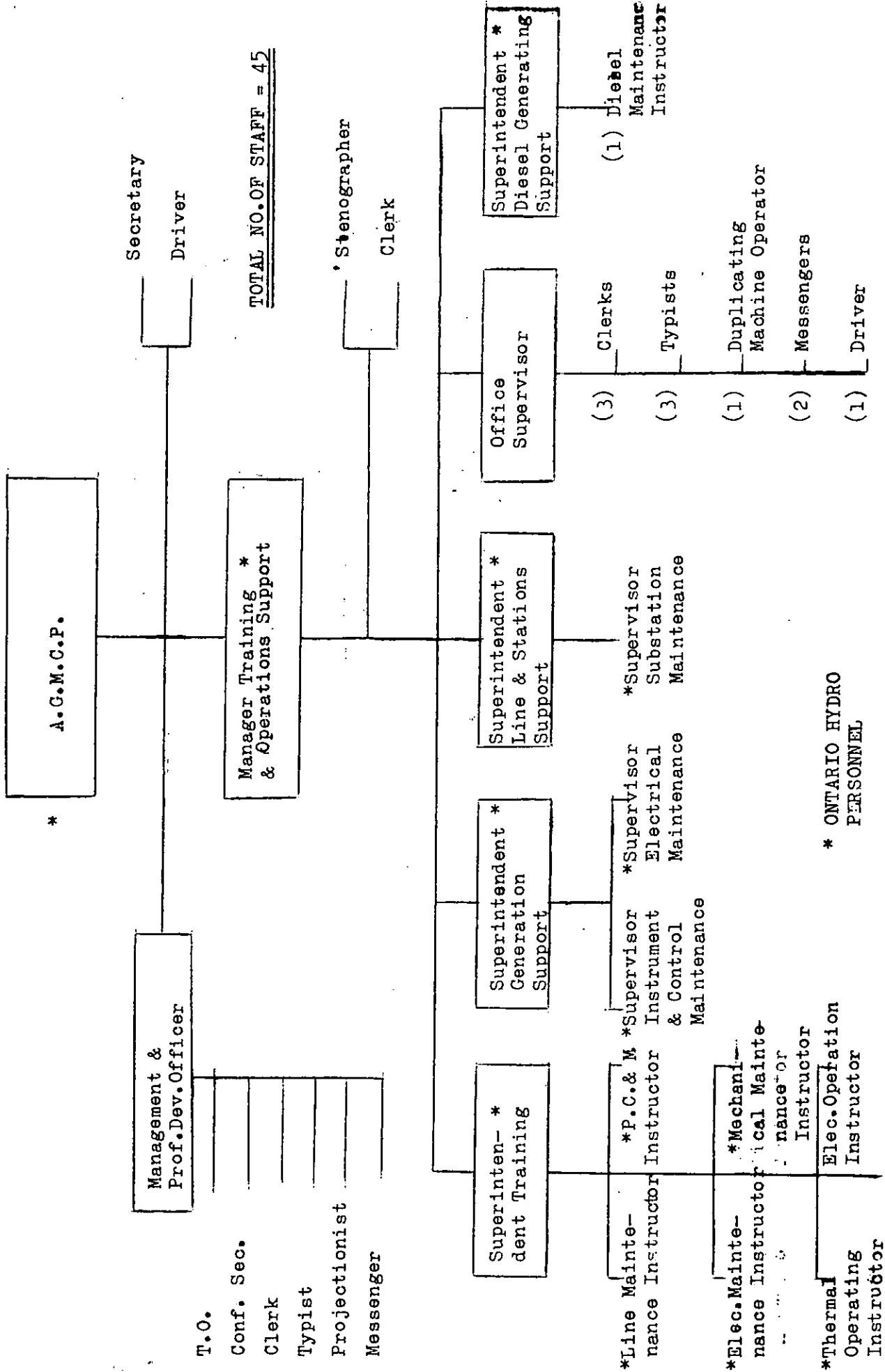
There were twenty-five Electrical Engineers on practical attachment abroad.

Degree Courses:

Thirty-one employees were pursuing various degree courses overseas as hereunder detailed:

Course	No. of Corporation's Grant-Aided Students
Electrical Engineering	16
Mechanical "	6
Civil "	1
Accountancy "	1
Administration "	3
Purchasing/Storekeeping	3
Industrial Chemistry	1
	31

CORPORATE PLANNING DIVISION
 PROPOSED ORGANIZATION 1973-74



TOTAL NO. OF STAFF = 45

(7) Instructors

* ONTARIO HYDRO PERSONNEL

NATIONAL ELECTRIC POWER AUTHORITY