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TRAINING OF MANPOWER IN THE PETROLEUM INDUSTRY IN EGYPT

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Introduction

The oil industry is a vast capital investment business in view of its intensive integrated operations, extending from the initial search for oil to the final sale of the product to the customer. The professional skill range within the industry has always been wide, and the average cost of an employee over his career in the industry is considerably high because the level of skill and knowledge required is generally high.

Accordingly, manpower in the petroleum industry has always been regarded as one of its vital assets and is ever more being given the appropriate attention in all its stages - recruitment, training and development of its potentialities.

In Egypt, the petroleum Sector has, for many years, been aware of this basic requirement and managers at all levels throughout the industry, have continuously been conscious of their duties in this respect; drawing up with the cooperation of training specialists, the necessary training programmes for their staff.

This brief preliminary study attempts to present the broad lines of the policy adopted in the recruitment and training of manpower in the Egyptian oil industry.

Labour Structure and Manpower Requirements

The structure of manpower in the oil industry in Egypt and the study of its present and future needs of experiences and skills reveal:

1. It is clear that the development of the functional growth of the industry is inclined towards growth in the employment of technical personnel at all levels, while unspecialized labour is gradually declining.

2. The relatively low percentage of the number of middle-level technicians compared with engineers. This results in the latter category shouldering responsibilities which are not compatible with their educational background and the skills required, which does not render possible the best utilization of their capacities.

3. The shortage in specialists and middle-level technicians needed for the development of natural gas fields is evident.

4. A shortage is particularly noted in the skills and experiences required for the development of offshore drilling and production facilities.

5. The estimated requirements of engineers of various branches of specialization constitute about 34% of the total requirements of high-level specialists needed over the next five years. The shortage is particularly noted in mechanical engineers who represent about 44% of the total requirements of engineers.

6. Workers in jobs which do not require any special skills or which do not call for any special technical education form about 16% of labour requirements in the next five years.

7. The percentage of skilled labour in occupations which are specific to the petroleum industry comes to around 25% of the total number of skilled workers.

General Outline of Training for the various categories of the labour force

(1) Training of Specialists:

a. Newly-engaged specialists. A well-defined permanent plan is set for newly-engaged high-level technical specialists, particularly those in key occupations. These follow basic training programmes varying from two to three years according to the field of specialization. In the early stages of the careers of new recruits, emphasis in their work is on technical knowledge and the skill required for their special field, but later supervisory talent is gradually developed to enable them to apply knowledge and skill through leadership. Among the new tools used to train newly-engaged university graduates in refinery operations, are simulators, which are mainly based on the principle of learning by guided doing.

b. Specialists already employed. The continuous updating of skill by refresher courses, seminars and training through job-rotation play an important part in the development of specialists. A large number of specialized courses, covering such fields as finance, production, marketing and industrial engineering, are conducted in company-owned training centres. More than 6000 employees have attended such courses over the last 4 years.

To accelerate the development of technical specialists the Egyptian General Petroleum Corporation has, during the past few years, actively initiated and arranged locally specialized training programmes run by international institutes for technical staff in the petroleum industry. Personnel from neighbouring Arab countries engaged in activities connected with exploration, drilling and production operations have actively participated in these programmes.

Overseas training is an important aspect of the efforts being made to further the skills and abilities of specialists in key occupations. Over the past four years, more than 300 employees have been sent abroad for specialized training in various fields of specializations; training mostly takes the form of field trips to enable trainees to get a first-hand impression of current procedures and practices relating to their work, and lecture and discussion sessions in group courses.

(2) Training of Technicians

These are middle-level personnel working in occupations requiring a knowledge of technology and science between that of a skilled worker and that of an engineer or technologist. Occupations at the technician level may include oilfield production and engineering foremen, drillers, drilling foremen and refinery plant supervisors. The following summarizes the general plan regarding the recruitment and development of some of the more important occupations.

a. Drillers - these are mainly recruited from technical secondary schools, although the trend has, during recent years, been to take on university graduates to meet pressing needs. New recruits with no university education attend a 4-year training programme, comprising 8 months of theoretical instruction in company-owned training centres and over 3 years of practical work at drilling sites, performing the duties of drilling crews. The trainee is promoted to assistant driller after two years of training followed by another two years to assume the responsibilities of a driller. Considerable drilling experience must be acquired by drillers to be promoted to toolpushers (in charge of operations at one rig during all three shifts). Periodical training abroad is almost a primary prerequisite for toolpushers to acquaint them continuously with the newer techniques and practices in drilling operations.

b. Oilfield Production Technicians and Foremen - New recruits selected from technical secondary school graduates go through a basic training programme of 4 years duration before taking over their responsibilities as technicians or foremen with supervisory responsibilities. Training is carried out primarily on-the-job at drilling sites, producing wells and production facilities; in addition, a general course in drilling and production lasting about 12 weeks is given in company-owned training centres, classroom lessons and practical work being taken alternately. Refresher courses are also periodically arranged as part of the general plan of training technicians.

It must be pointed out, however, that in order to raise the standard of proficiency of technicians in general, present recruitment policies aim at recruiting men of higher educational level, such as petroleum engineers or graduates of higher [illegible] petroleum institutes, to fill their jobs. This has been dictated by the fact that oilfield production operations are becoming more and more complex and the technical problems associated with them are on the increase, involving a wide range of engineering techniques, which call for higher levels of skill and knowledge.

(3) Training of skilled workers

The plan of training for the geater part of this category of the labour force is based on industrial apprenticeship which combines theoretical and practical traing inside training centres and planned on-the-job rotation at work sites on production equipment, recruitment being made from school boys who completed approximately 9 years of general education.

It is obvious that the training and development of skilled workers in occupations specific to the petroleum industry can only be effected within the industry, whereas requirements of labour in general trades could be catered for through national technical schools and vocational training centres.

The educational level of employees at the skilled worker level varies widely, and only until recently has some thought been given to formalized training for them, instruction primarily being given on the job. But training programmes directed to skilled workers are now being developed by some companies and presented by their specialists; in some instances certain portions of a training program must be completed to qualify for promotions to jobs requiring special skills. It is generally recognized that increased efforts must be made to elevate the overall standard of performance of old skilled workers, the majority of whom picked up their skills and experiences through actual practice without any real organized effort being made towards their training. "Simulated training" was introduced in refineries some years ago, and has proved particularly valuable in instructing start up crews and augmenting training programmes designed to upgrade refinery operator skills. This new concept of training is based on the principle of learning by "guided doing", using devices which simulate actual process operations in refinery units.

(4) Training of Semi-Skilled workers

These workers are trained according to an accelerated training plan, to enable them to perform duties in specific jobs. Workers of this category come mainly from two sources - either they are upgraded from the unskilled labour or are taken from graduates of preparatory schools. Their basic training programmes lasting from 3 to 5 months comprise practical work and some elementary theoretical knowledge.

General Principles of the Training Plan

Generally speaking the training plan for employees in the Egyptian General Petroleum Organization and its affiliated companies is based on the following principles:

1. Basic reliance on the potentialities existing within the petroleum Sector.

2. Coordination between the training programmes and facilities available within the industry, so that available resources can be used to the best advantage.

3. Detailed studies of job requirements to determine the skills, abilities and knowledge required.

It may be of interest to note that training plans in the petroleum Sector is implemented in the following two ways:

a. Programmes conducted on the Central Level:
These are group functional courses run in EGPC training centres on work of standard character common to the various branches of the industry. Central training renders possible the maximum utilization of the abilities and skills of specialists within the various fields of activity, and who may not be available in every company within the industry. Furthermore, training costs are reduced because of financial burdens being equitably shared by all the companies.

b. Decentralized Training Programmes:
This training is tailored to suit the specific requirements of a particular company and is carried out inside the companies. It also includes training activities run by outside training organizations and of which use is made to train senior management and middle-level technicians and foremen.

Existing Facilities for Training

To supplement on-the-job training, the petroleum Sector in Egypt has established a large number of training centres to meet present and future needs of skills and experiences at all levels of manpower. The following is a review of the training centres available within the Sector:

a. The Central Administrative Training Centre in Cairo:
This centre was established in 1956 and organizes some 25 specialized courses every year for top and middle-level personnel in different functional fields. Courses for graduates include drilling, production, marketing, industrial engineering, materials maintenance, planning and evaluation of projects, finance and supervision.

b. The General Petroleum Co. Training Centre for Drillers:
Established in 1964 to help meet the Company's future requirements of drillers and production foremen. The training programme conducted is designed for newly-engaged technical secondary school graduates and is of 4 years duration - 8 months theoretical instruction during the first three years and the remaining period is spent on practical work in drilling, production and oilfield engineering.

c. El-Nasr Co. Vocational Training Centre:
Inaugurated in 1955 to cover the Company's requirements of skilled labour in engineering trades and refinery plant operators. The first three years of apprenticeship training combines theoretical studies and practical work inside the training centre and in plants and workshops, while the fourth year is totally devoted to practical training on production equipment under the supervision of the training centre instructors.

d. There are four other vocational training centres, which run various specialized courses, primarily designed to upgrade the skills and knowledge of labour engaged in various activities connected with marketing - sales techniques, petroleum products, lubrication, aviation service, handling of LPG.

COOPERATION WITHIN THE ARAB WORLD AND REGIONAL COOPERATION

The development and training of manpower is an inevitable course of action in the developing countries seeking economic and social progress. The planning and coordination of this activity on the national and regional plan and finding the suitable formula for cooperation among the training organizations in the countries of the same area, enables improvement of the utilization of available capacities and resources. Towards this end, it is proposed that a central national machinery be set up within the oil industry of each country and that national training concerns cooperate by the exchange of know-how among them and the integration of their means.

A permanent committee may be formed of representatives of these central concerns to assume the following tasks:

1. Study of training plans and programmes at the level of member States to find out the means of coordinating their activities.

2. Joint setting of a general outline for a training plan covering member States.

3. Joint practical studies of the real conditions of available facilities and training requirements, classified according to type and time suitable for the needs of each country.

4. Studying the feasibility of setting up training institutes and centres to serve groups of countries within the same area or all the countries of the area.

5. Exchange of information on accomplishments, ideas and training subject matter, technical references, methods and techniques.

TRAINING PROGRAMMES FOR SPECIALISTS

1. Project Planning Course

Objectives: The programme is intended to train personnel responsible for the planning and follow-up of projects in the use of modern scientific methods of planning, programme layout, review and evaluation of projects.

Subject : Project planning techniques, PERT TIME SYSTEM, applications on the 'Pert' cost, introduction to the evaluation and review of programmes, applications of the use of computers in the 'PERT' system.

Designed for: Engineers and accountants engaged in project planning and follow-up, with no less than 5 years experience.

2. Marketing Operations Course

Objectives : To help marketing operations staff to develop a systematic approach to problems normally encountered in this field and to recognize situations in which improved performance can be obtained, as well as bring them up-to-date regarding recent development in marketing operations. Also to give staff the latest thinking on how they should go about the necessary forward planning.

Subjects : Management and forward planning, capital expenditure procedure, payout and profitability, management control of cost and performance, management accounting, methods planning in marketing operations, transport economics, project follow-up, case studies.

Designed for: Staff engaged in marketing operations with no less than ten years' experience

3. Quality Control Course

Purpose: To stress the importance of quality control and provide knowledge of the problems and techniques relating to this field.

Subjects: Elements of quality control programming, quality control economics, integrated systems for quality controls applications and practical case studies on quality control.

Designed for: Engineers, chemists and technicians engaged in marketing operations, quality control, and technical services.

4. General Executive Course

Objectives: To enable members to gain a better understanding of the techniques of management, through the discussion of its functions and principles.

Subjects: Organisation of production units, elements of integrated national planning, principles of management, delegation, communication, performance appraisal, work simplification in services and clerical procedures.

Designed for: Staff of department head level and staff who have a reasonable amount of administrative experience.

5. Productivity Course

Objectives: To discuss the general factors affecting productivity and the techniques of methods planning.

Subjects: Definition of productivity, recording and analysis of work methods, systems and procedures, quality control, cost control, layout and materials handling, productivity in clerical jobs, applications and films.

Designed for: Department head level staff, engineers and supervisors whose work puts them in a position both to use themselves and to inspire others to use productivity techniques.

6. Finance Course

Objectives: To enable trainees to gain a better understanding of the field of finance in all its aspects and thereby broaden and modernise their thinking.

Subjects: Nature of the responsibilities of finance departments, management accounting, planning and financing in the petroleum industry, foreign currency, materials control and handling, capital assets, financial analysis and data processing, performance appraisal, internal auditing simplification of clerical work methods, data processing.

Designed for: Accountants and specialists whose work is connected with capital assets and depreciation.

7. Costing Course

Objectives: To broaden participants' understanding of the basic principles of costing systems applied in oil companies, both from the theoretical and practical aspects.

Subjects: General framework of costing systems applied, budgets, cost centres, economics of investment projects, performance norms, elements of costing in exploration, drilling, production and marketing activities.

Designed for: Accountants in departments concerned with costing, and specialists earmarked for executive positions.

TRAINING PROGRAMMES FOR TECHNICIANS AND FOREMEN

1. Drilling & production programme

Designed for: Newly engaged technical school graduates to be employed as drillers or production foremen.

Duration: 4 years approximately.

Subjects: Geology and petroleum geology, physics, hydraulics, drilling techniques, drilling fluids, instruments, field engineering, production technology, dehydration, safety engineering, English language, supervisory training.

Note:

The programme consists of about eight months theoretical instruction given during the first three years of training, the remaining period being practical work in drilling, production and engineering (roughnecking, diesel engines, general repair work, well pulling crew, gauging, dehydration, etc..)

2. Supervisory training course

Objectives: To enable foremen and first line supervisors to gain a better understanding of their functions and responsibilities towards production and the training of their subordinates. To discuss working relationships and cooperation and to increase a supervisor's ability in giving instructions and report writing.

Subjects: The functions and responsibilities of foremen, report-writing, the giving of orders, completed staffwork, principles of management, productivity, work moral, safety, speech training.

Designed for: First line supervisors in charge of labour.

3. Safety training course

Objectives: To draw the attention of members to the techniques and importance of industrial safety and accident prevention and their effect on raising productivity.

Subjects: Objectives of industrial safety, accident causes and their analysis, hazards in the petroleum industry, inspection of work places, fire fighting, safety equipment, safety committees, safety legislation, occupational diseases, accident reporting.

Designed for: Supervisors whose jobs entail the operation, repair and maintenance of plant and equipment.

4. Materials course

Objectives: To discuss methods and procedures related to materials departments' work, with emphasis on local and foreign purchases and the storage and issue of materials.

Subjects: Materials dept. organization, productivity, planning and followup classification of materials, orders, purchases, materials handling, storage and maintenance of materials, issue of materials, surplus materials, stock control, moveables, data processing.

Designed for: Materials departments' personnel.

5. Maintenance course

Objectives: To stress the importance of preventive maintenance and its role in making the best use of machines and equipment and reducing cost. To draw attention to the principles of formulating maintenance programmes.

Subjects: Facilities needed to formulate and implement maintenance programmes, control of maintenance operations, setting standards of performance to determine capacities needed, percentage utilization of equipment and cost of breakdowns, heat treatment, practical examples.

Designed for: Technicians and foremen in technical departments.

6. Salesmanship course

Objectives: To inform and instruct members concerning marketing procedures and sales techniques and assist them on how to solve customer problems.

Designed for: Personnel engaged in the marketing of petroleum products.

7. Marketing service course

Objectives: To give more advanced instruction to sales personnel in the properties of products which they handle and discuss the customer problems which are encountered.

Subjects: Petroleum products, the benzine, diesel and steam engine, lubricating oils and greases, the relationships between the sales, technical and finance functions, customers' problems.

Designed for: Staff concerned with the sale of petroleum products.

8. Marketing operations course

Objectives: To give a wider knowledge of practices and procedures relating to the transport and storage of petroleum products, and study the engineering aspects of the distribution facilities used, as well as the planning of installations and depots.

Subjects: Types of petroleum installations, methods of supplies and distribution, transportation means, storage of petroleum products, loss control, pumps and product pipelines, planning of installations, service stations, general maintenance work, quality control.

Designed for: Technicians concerned with the distributions of petroleum products.

9. Product measurement and loss control course

Objectives: To familiarise personnel concerned with the transport and distribution of products with factors which affect product leakage and losses.

Subjects: Sources of losses, product measurements, calibration of underground tanks, storage tank construction, filling equipment, transport facilities, losses in service stations and airports, quality control.

Designed for: Staff working in petroleum installations, airports and supply and distribution departments.

10. Service station course

Objectives: To discuss the various technical and administrative functions of supervisors responsible for running service stations, to increase their effectiveness on-the-job.

Designed for: Service station superintendents, sales inspectors and salesmen, who have previously attended a course in lubrication.

Subjects: Uses of petroleum products, lubricants and special products, service station equipment, TBA, and specialities, advertising, greasing, selling techniques service station records, market analysis.

11. Lubrication course

Objectives: To provide practical knowledge on the main components of a vehicle and the properties and uses of the products which it needs.

Designed for: Personnel responsible for car lubrication in service stations.

APPENDIX 3

TRAINING PROGRAMMES AND COURSES FOR SKILLED LABOUR

1. Apprenticeship Training Programme

Designed for: Newly-engaged apprentices who have had nine years of general school education.

Duration: 4 years of apprenticeship training.

Objectives: To develop skilled labour in the following trades:

Artisan (A)	Turner, fitter, pumpman
Artisan (B)	Metal sheet worker, welder, blacksmith
Electrician	Electrician (general, power and instruments), instrument mechanic.
Mechanic	Diesel mechanic, automotive mechanic.
Refinery plant	operator.

Subjects: Engineering drawing, industrial drawing, mathematics mechanics, science (chemistry and physics) tool technology, metallurgy, petroleum technology, English language, safety.

Note:

The first 3 years of instruction comprises theoretical studies and practical work inside the training centre and in plants and work-shops. The fourth year is totally devoted to practical training under the supervision of the training centre instructors.

2. Service Station Course

Objectives: To enlarge on the theoretical knowledge and experience of service station workers and help instil in them a greater insight of the way they should operate.

Subjects: Sales techniques, petroleum products and their uses, fuels, special products, use of service station equipment, industrial safety, fire precautions, human relations.

Designed for: Service station labour.

3. Lubrication Course

Objectives: To develop the basic theoretical and practical knowledge of personnel concerned with lubrication in service stations so that they may work more effectively.

Subjects: Automotive mechanics, lub. oils, greases and other automotive products, service station equipment, practical work on lubrication, industrial safety, fire precautions.

Designed for: Greasers in service stations.