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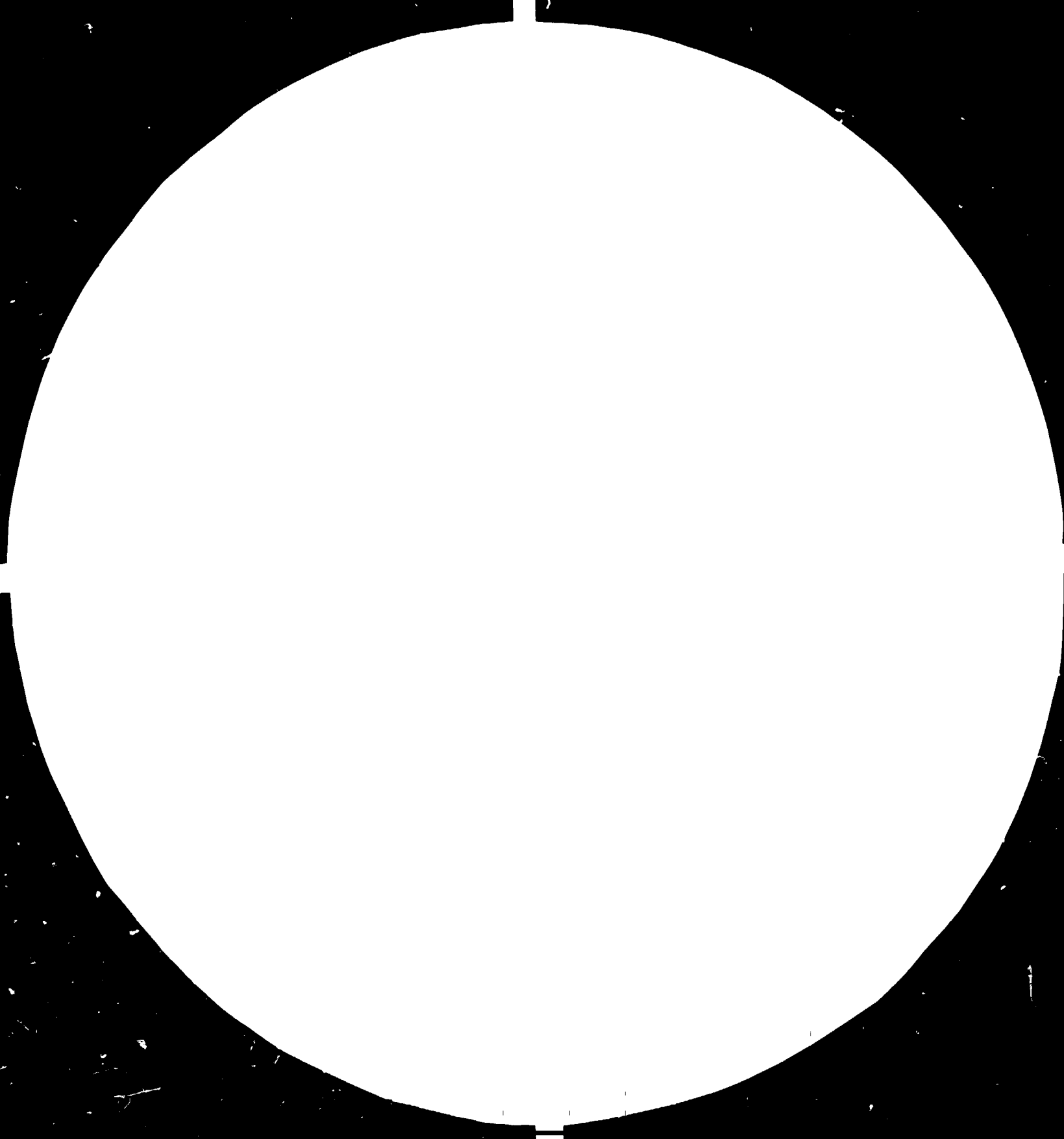
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MICROCOPY RESOLUTION TEST CHART

NATIONAL BUREAU OF STANDARDS
STANDARD REFERENCE MATERIAL 1904
(ANSI and ISO TEST CHART No. 2)

UNIDO PROJECT NO. : DP/TUR/75/059

UNIDO CONTRACT NO. : T-81/25

ACTIVITY CODE : 10.22.31.5

14323

Turkey.

Fertilizer training centre.

FINAL REPORT

Submitted by

p&d

PROJECTS & DEVELOPMENT INDIA LIMITED

96-'SIDDHARTH' NEHRU PLACE, NEW DELHI-110019 (INDIA)

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SYNOPSIS

The project contract for "Expansion of Training facilities and programmes of AZOT SANAYII T.A.S." was signed in June, 1981.

The PDIL team leader and one expert had a preliminary visit to Turkey in the first fortnight of July 1981.

The first Orientation programme was conducted between 22.11.1981 to 4.2.1982.

This was followed by the training in India of groups of six Design Engineers and seven Trainers from AZOT SANAYII for six and four months respectively.

Next followed the "Repeat Orientation Programme" which was conducted by the AZOT experts. Next the first "Refresher Training Programme was conducted by PDIL experts & was later followed by the "Repeat Refresher Training Programme" conducted entirely by AZOT experts.

The project was to conclude in June 83 as per original schedule, but due to delays in the start of the first orientation programme and in completing formalities for the visit to India of the two groups, the project ended in October, 1983.

During this period mechanical and electrical workshops, Instrumentation and chemical laboratories and a library were established at the Kutahya Training Centre.

An electronic process simulator for training of the operation staff of fertilizer plants was also installed and commissioned.

The training centre is now capable of designing and conducting training programmes, seminars etc. for fresh as well as experienced employees of fertilizer plants.

The design group established at AZOT SANAYII head office at Ankara, is also functioning and carrying out simple assignments. It will eventually grow as more and more information, documentation and experience are assimilated.

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INTRODUCTION

The aim of the project as spelled out in the contract was to improve and expand the present training facilities of AZOT SANAYII to enable it to provide on a continuing basis.

- a) Training to a sufficient number of national technical personnel to man its present and future manufacturing plants and
- b) Technical and other relevant information required by national engineers and technicians working in the fertilizer and other chemical industries to update their knowledge and keep abreast of new developments in their fields of specialization.

To accomplish the above the following was done.

1. Orientation programmes to induct fresh engineering graduates and technicians in the fertilizer industry were planned. All relevant lecture material was supplied. One programme was run with the help to Indian experts and this was later repeated by AZOT SANAYII experts on their own.
2. A group of 7 trainers was trained in India for four months in Training methods and techniques and various management disciplines. Thus a nucleus of training experts was formed.
3. A group of six design engineers were trained in India, in design engineering, systems and

procedures of design departments, and required documentation, for six months forming a nucleus for a design department to function in AZOT SANAYIII.

4. The work of the above group was started and initial guidance for 2 months was given by an Indian expert.
5. Sixteen refresher programmes for experienced engineers and technicians on different subject were organized, conducted and all the lecture material supplied.

The same set of programmes were repeated by AZOT experts later, on their own.

It can thus be seen that at the conclusion of the project the basic capability and facilities for planning, designing and conducting training programmes for all types of employees, and for growth and development of a design engineering organization, has been firmly established in AZOT SANAYIII.

2 CONTRACTOR'S SERVICES AND PERSONNEL

1. During the discussion between the team leader and the management of AZOT SANAYII for working out the details of the topics to be covered both in the orientation and particularly the refresher programmes, it was agreed that some changes in coverage of various subjects mentioned in the contract were desirable, taking into consideration the actual needs of AZOT SANAYII.
2. It was therefore agreed that an additional expert on Nitric Acid and Ammonium Nitrate Technology be included, as production of these chemicals is one of the major activities of AZOT SANAYII.
3. PDIL agreed to include such an expert and also to put in an additional 15 mandays at its own cost in the interest of the project work. Mr S K SARKAR was thus included as an additional expert.
4. During the period of the contract the safety expert Mr R RAMADORAI left the services of the contractor. He was replaced by another safety expert Mr V K SINGH for the refresher programme.
5. The scope for some of the topics was altered to better reflect the needs of the organization. Hence, total manmonths remaining the same, the service of individual experts was adjusted as per requirement.

6. The original sequence of activities mentioned in Annexure E of the contract (Pages 2 to 11) had to be altered mainly because a) There was delay in deputing the AZOT Teams to India for fellowship training, and,
- b) It was thought better, that AZOT SANAYII personnel repeat the orientation programme only after the training group was trained in India on Training methods and techniques.

The Bar chart at annexure I shows the actual sequence of the various activities conducted.

3 REPORTS

As stipulated in item 2.10 of the contract the following reports have been submitted to UNIDO, Vienna, whenever they were due.

<u>DESCRIPTION</u>	<u>DATE OF SUBMISSION</u>
1. Preliminary Report	23.9.1981
2. First Quarterly Report	25.12.1981
3. Second Quarterly Report including the report on first orientation programme	20.3.1982
4. Series of 7 reports by individual experts	20.3.1982
5. Third quarterly report	17.6.1982
6. Fourth quarterly report	16.9.1982
7. Report on fellowship programmes Training in India of 7 design engineers and 6 trainers.	6.12.1982
8. Fifth Quarterly report	24.12.1982
9. Sixth Quarterly report including the report on repeat orientation programme	11.4.1983
10. Report by design expert on setting up design engineering facilities in AZOT SANAYII	31.5.1983
11. Seventh Quarterly report	30.6.1983
12. Report on first refresher programmes	25.7.1983
13. Series of 8 reports by individual experts on refresher programmes	30.9.1983
14. Eighth Quarterly report	15.9.1983
15. Report on repeat refresher programmes	31.10.1983
16. Draft final report on the project	31.10.1983

4 PHYSICAL FACILITIES DEVELOPED IN KUTAHYA TRAINING CENTRE

The Kutahya Training Centre now can be considered a well equipped institution capable of conducting orientation and refresher programmes for personnel of fertilizer industry.

15 engineers and 25 technicians can be given orientation training at one time.

Similarly refresher programmes for I group of 10-15 engineers and one group of 10-15 technicians can be run simultaneously.

This is on the basis of physical facilities developed here. The manning of the institution has to be adequate to run the above programmes.

- a) The mechanical workshop has three lathes, one milling machine, two shapers, one slotter, one drilling machine, two welding sets, one power saw, one hand shear, one grinder, and eleven vises. All the machines are in excellent condition and can even be used for advanced training of technicians.
- b) The electrical workshop has work benches, multiple instrument test panels and many exhibits.
- c) The chemical laboratory is equipped with apparatus, work benches and chemicals needed for various analyses done in the factory.

d) A pilot plant has been set up in the instrumentation laboratory where all types of instruments for indication and control-like pressure, flow, level, temperature have been installed to simulate plant working conditions. A group of 6-8 instrument technicians can be trained here at a time.

e) An electronic computerised process simulator for training of operation technicians and engineers has been installed in a separate room.

Six to eight persons can be trained here and any process conditions, upsets etc. can be simulated and correction action discussed.

f) There are enough small and big classrooms for conducting lectures, group discussions, etc.

g) All important audiovisual aids like epidiascope, film and slide projector, overhead projector are available in the institute.

h) A library has been set up. A small collection of very good books is already there. It will grow as more and more books are added to the stock.

5 STAFFING OF TRAINING CENTRE

One of the most important prerequisites for efficient running of any institution is its staffing. It is even more important when the institution is an industrial Training Centre.

The problem of proper staff for the Training Centre at Kutahya has been raised several times before in many reports. Work in a training institution cannot be easily measured and accurately evaluated, but only an adequate number of qualified training staff can ensure proper utilization of the training facilities.

Seven officers of AZOT SANAYII were specifically trained in India in Training policy, methodology, administration and recent management techniques. It is a matter of regret that only two of these seven are at present working in Training Centre. The rest have assignments in their original places in the factory. If these people do not practice and developed the knowledge and skills they have learnt during their training in India, the chances are that they will gradually forget these. It would be a great tragedy.

There are many activities, apart from actually conducting training programmes, that should be regularly carried out in a training organization.

Training needs have to be systematically assessed. New training material has to be collected and developed. The training staff must be familiar with new management

systems, techniques, and technological developments in fertilizer industry. A liaison has to be maintained with other training bodies in the country. Training aids have to be prepared and seminars have to be arranged. The workshop machines have to be used for development of skill of technicians. The library has to be developed by systematic and careful addition of books and journals.

Each of those activities needs a constant effort on the part of the training staff. In the absence of adequate and qualified staff the whole training function will suffer.

It is understood that AZOT SANAYII has administrative difficulties in sanctioning the requisite staff. We can only hope that these difficulties are overcome in a short time and a full complement of staff is assigned to the training centre at the earliest.

Without this important prerequisite all the resources now developed at the Kutahya Training Centre will remain only partially utilized and AZOT SANAYII will not get the expected returns of this well thought of and very useful project.

6 MAJOR ACTIVITIES DURING THE PROJECT PERIOD

A) Exploratory visit of PDIL Team:

The team Consisting of the Team Leader Mr P G BORWANKAR and expert Mr P C DATTA visited Turkey between 10 June and 14 July 1981.

They visited the Kutahya and Gemlik units of AZOT SANAYII and had discussions with senior officers at both these places.

Later they had discussions with the General Manager and senior officers at Ankara head office.

The outline of the work and the various phases were drawn and understanding reached in general as to how the work would proceed.

The details of this visit can be seen in the "Preliminary Report" submitted on 23.9.1981.

B) First Orientation Programme:

This programme for 15 fresh engineers and 25 fresh technicians was to start from 1.9.1981. But there were difficulties on the part of AZOT SANAYII and it started on 15.11.1981. Also, since neither fresh engineers nor fresh technicians could be arranged, the programme was attended by experienced engineers and technicians.

Seven Indian experts, excluding the team leader participated, in the programmes which ended for

technicians in the 1st week and engineers in the second week of February 1982.

The lecture material was sent from India. It was translated and modified with local additions.

The lectures were mostly taken by Turkish experts.

For further details please refer to "Report on the First Orientation Programmes" submitted on 20.3.1983 and the report of individual experts on the same. and the report of individual experts on the same.

C) Training of design engineers in India:

AZOT SANAYII intends to set up a Design Engineering department of its own. For this purpose, the Design Fellowships were planned. Six engineers were trained in India for six months. Four were Chemical Engineers one was a mechanical, and one was an instrumentation engineer.

The group reached India on 20.4.1982 and returned to Turkey on 31.10.1982. Their Training included lectures, specific design assignments, visits to design organizations and working plants designed by these design organizations. They studied the systems and procedures, functions of different sections of the design department, its linkage with other parts of the organization, and documentation.

For further details of this, Training, please refer to "The Report on Fellowship Programmes" dated 7.12.1982.

D) Training of Trainers in India:

The construction of the Kutahya Training Centre building was completed in 1981. There was no properly trained staff familiar with training methodology and techniques. It was therefore essential to have a nucleus of such trained training staff to shoulder the burden of the expanded training facilities.

Seven engineers were therefore selected for training in India in modern systems and techniques of training, its methodology and organization. The group reached India on 26.5.1982. Their training included lectures, group discussions, visits to Industrial and Management training institutions and operating fertilizer plants. They returned after training on 23.9.1982.

For details of this training please refer to the "Report on Fellowship Programmes" at 7.12.1982.

E) Repeat Orientation Programme:

During the first orientation programme, Indian experts were present. The idea behind repetition of this programme under the supervision of the Team Leader was to give practice to local experts and develop their confidence for conducting such programmes in future.

The programme was conducted between 1.11.1982 and 8.2.1983. This time, again fresh engineers and technicians were not available and experienced persons were admitted. However the average length of experience was less than in the first orientation programme.

For further details, kindly refer to "Report on Repeat Orientation Programmes" dated 11.4.1983.

F) **Setting Up Design Engineering Department:**

Originally it was envisaged that a full fledged Design Engineering Department would be set up in AZOT SANAYII. Later, during the discussion of the team leader with AZOT Management during the preliminary visit of the team leader, the immediate scope of activity was clarified. It was to train a group of 6 design engineers in Design Engineering, the working of the department, its functions and relationships with other services. This was to be the nucleus which over a period of years will develop into a full fledged Design Engineering facility.

Pursuant to this, the group was trained in India for six months. After their return the Design expert from India came to Turkey for two months. During this period he made recommendations concerning the short term and long term assignments for each member of the group, covering the whole area of Fertilizer Technology. He also guided them in

working out short term projects.

Collection of Technical information, standards and specifications, documentation, are very vital to the work of Design Engineering. Guidelines have been given for this.

The group is working well. Gradually it is expected that they will be associated with all technical discussions, project and design negotiations, and will ^{be} given opportunity to work with contractors and consultants so that they are thoroughly familiar with modern processes, design practices and the work of major fertilizer companies possessing the latest knowhow.

For details of future lines of activities, growth and development of this department the report of the design expert dated 31.5.1983 may be referred to.

G) Refresher Programmes:

In the present situation of fast technological development if one does not keep abreast of the latest developments, his knowledge gets out-dated quickly.

The basic aim of the Refresher Programmes was to train experienced engineers and technicians in modern processes, developments, maintenance techniques, etc. so that.

- a) They can perform existing jobs better.
- b) They are prepared to take higher responsibilities and,
- c) They are familiar with the latest developments in the fertilizer industry.

A total of 16 courses and 4 seminars were conducted between 29th March 1983 and 24th June 1983.

The contents were determined on the basis of training needs given by AZOT SANAYII and in consultation with senior officers.

The lecture material was prepared by Indian experts in advance and sent to Turkey where it was translated into Turkish and made available to the local experts.

For each programme, a local expert was identified as counterpart to the Indian Expert.

In instances where this expert did not know English, another "Interpreter" was also present in the classroom.

The lectures for engineers and officers were given by Indian experts and for technicians by Turkish experts with intervention by Indian experts as necessary.

Each programme was evaluated at the end through discussion and a written questionnaire.

In general the programmes were well received. The participants also gave many suggestions which are being closely looked into and will help in making

future programmes more useful and relevant.

For details of this activity kindly refer to the "Report on the First Refresher Programme" dated 25.7.1983 and the reports of individual experts on the same.

H) Repeat Refresher Programmes:

The First Refresher Programmes were conducted in the presence of the Indian experts. Since the Training Activities will continue, in order that the Turkish experts get more practice and confidence, it was planned to repeat the whole set of programmes by Turkish experts alone while the team leader was still in Turkey.

The repeat programme schedules, contents etc. were identical with the First Refresher Programmes except that the "Instrumentation Technology" courses had to be dropped as there were no participants available. The programmes were conducted between 4.7.1983 and 14.10.1983.

Each of these programmes was also evaluated. The programmes were received well and we feel that the basic purpose was fulfilled.

For further details kindly refer to the "Report on Repeat Refresher Programmes" dated 30.10.1983

7 LECTURE NOTES

An important contribution by PDIL during this project was the preparation and supply of training material in the form of lecture notes to be used by local experts.

Each expert prepared such material concerning subjects in his area of expertise.

A total of about 4500 pages consisting of lecture material, graphs, charts, flow diagrams, figures, sketches, pictures, transparencies, exercises and tables were prepared and submitted to AZOT SANAYII for translation and use.

In some cases, the local experts also prepared lecture material concerning AZOT plants and Turkey. These were also used during the various courses.

A total of about 8 manmonths were put in by the Indian experts in the home country to compile this vast material. Annexure II gives the list of experts and subjects on which they prepared the lecture notes.

8 A LOOK INTO FUTURE

At the conclusion of the project it is the right time to take a look at the future.

Two main activities have been promoted in this project. They are (A) training and (B) design engineering.

A. Future of Training:

1. With the facilities established and the hope that a full complement of training staff will be made available we can see that the centre can undertake progressively the following.

- i) Induction programmes for all employees of AZOT S.WAYII.
- ii) Orientation programmes for all fresh personnel whether technicians or engineers.
- iii) Refresher programmes on all technical subjects relevant to the needs of not only AZOT factories but other fertilizer factories.
 - Production Planning Control
 - Budget, cost and cost control
 - Project Management
 - PERT/CPM
 - Management Information Systems.

2. Another important activity that should be undertaken is to organize seminars on an inter company or national basis. These will fall into two categories.

- a) General Seminars where important subjects can be presented by selected experts and then discussed.
- b) Specific Seminars where The Designers, Manufacturers and users of particular equipment/systems in fertilizer or chemical industries come together and discuss problems of mutual interest such as operating difficulties, modifications, spareparts availability, aftersales service etc.

A lot of preparation, a minimum 3-6 months, is required for such seminars, but all the trouble is worthwhile as many practical problems get solved and even development/ modifications/improvements in the equipment and services can take place quickly.

3. Research/investigation is another important activity of the Training institute. This should not be confused with the work of a normal Research Department.

The Training Centre should always be on the look out for organizational weaknesses, Training Needs, effectiveness of the training that is being imparted, its cost benefit analysis, future requirements of personnel in view of the proposed modification or expansion of the plants and so on. Training based on these studies will be more acceptable, relevant & useful.

4. Lastly over a period time, at least one person will have to be developed in the "Behavioural Science" area. No matter what the technology or culture within an organization, work has to be done by individuals and groups, and unless the supervisors and managers understand why and how people work, what motivates them and what frustrates them, any technological system will be ineffective without the contribution of the people within it.
5. With experience and practice over a couple of years the Training institute will be in a position to conduct national and international programmes in fertilizer technology. It is, however, necessary to mention here that for

such activity, the training centre will have to take help of experts from the operating plants, design, project and other specialized departments. No training institute can be self sufficient in expertise to conduct courses for persons actually working in fertilizer industry for number of years. Help of practicing managers and experts in various fields is essential.

B. Future of The Design Engineering:

- i) The Design group trained in India consist of bright and enthusiastic engineers but they have very little experience and are new to the field. They should get all the opportunity and encouragement possible so that they can develop into competent design experts.
- ii) To start with, they can carry out feasibility studies and prepare complete project reports. The next step would be to do detailed engineering of projects. Design of systems and simple equipments, laying down specifications, calculation of material and energy balances should be routine activity. Acquisition of process know-how through licenses, comparison and selection of processes, technical evaluation of competitive bids etc can then follow.

iii) Helping the local industry in developing fabrication facilities for equipment required in the fertilizer industry will be another challenge. This will help in achieving a greater degree of self sufficiency in the fertilizer industry.

iv) Consultancy and engineering services can be extended later to other fertilizer factories or chemical plants in Turkey or in the nearby area.

The ultimate aim should be to develop the design engineering capacity to such an extent that AZOT SANAYII can take up complete "TURNKEY" projects for others in any area of fertilizer technology.

It should be remembered, however, that both training and design engineering are new activities in this organization. Like a delicate plant they will need tender care and powerful management support if they are to develop into vigorous self supporting departments as envisaged above.

9 ACKNOWLEDGEMENT

The former General Manager Mr ÖZDEN gave his full support and set the ball rolling in the right direction at the commencement of the project. Without his drive in the initial stages of this project it would not have been possible to get things into right gear. We are highly grateful to him.

The present general manager Mr Uğur ÖZGÜL has been a pillar of strength throughout the life of the project. He was instrumental in finalizing the details of programmes and schedules and has been the guiding star. A major portion of the credit for the success of the project goes to him. We are highly indebted to him.

Mrs Sevim RENDA, the head of APK and Training at the head office at Ankara was always very patient, helpful and greatly interested in the project. Her help at every stage was very valuable. She was always very sympathetic during times of difficulties and helped to keep our morale high throughout the whole period. We are highly obliged to her.

The other officers at head office namely Mr Ertan IRUN, Mr Hüsnü SAĞUN, Miss Fatoş CANBORGİL, all were very cooperative and considerate, and took pain in organizing details of the work. Miss Fatoş needs special mention for all the trouble she took in connection with arrival, accomodation and travel arrangements for the Indian experts. We are highly grateful to all of them.

At Kütahya, the factory Manager Mr Bilent CAN, with his keen interest and drive, facilitated work. He gave his time unhesitatingly and was a source of inspiration not only to the training centre staff but also to the plant personnel. In spite of his heavy responsibilities the amount of time he spared for this project, including his direct participation in lectures, discussions etc., has been an eye opener to many. He deserves special gratitude from all of us.

The deputy managers, Mr Yilmaz KABAN, Mr Fikret ÇALIŞAL and Mr Yüksel ŞENEL all supported the training fully and ungrudgingly extended whatever help was asked of them.

The departmental heads and senior officers at Kütahya were also highly cooperative. They were responsible for creating a general atmosphere congenial to the growth and development of Training here. All deserve our gratitude.

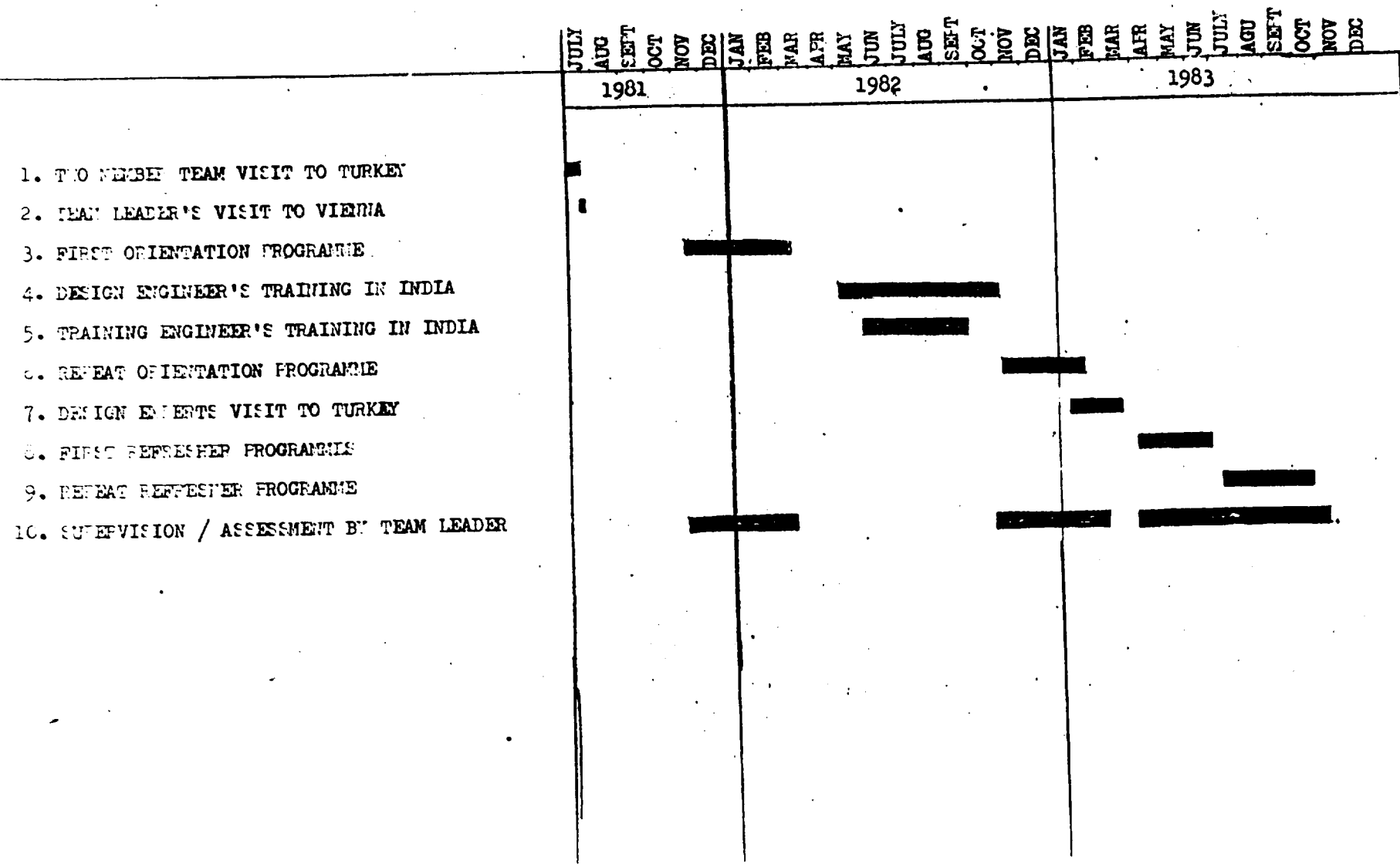
Mr Sacit POLATER, the translator, did various service in carrying out the most important work of bridging the language barrier. His work was very meticulous, accurate and quick. We are in his great debt.

Mr Narasimhan, UNDP Ankara, took keen interest in the project work throughout. His visits here were very helpful. He and his team at Ankara extended all the help asked, promptly and willingly. Mr Narasimhan's guidance was available all the time. We are grateful to him and his staff.

We are grateful to the team of Indian experts, who did an excellent job both in preparation of detailed lecture notes, in conducting the programmes in Turkey, and in cooperating with their counterparts in many ways. Last but very important was the contribution of the training centre staff and all those who went to India for training. The general atmosphere of work at the training centre was very congenial. It was a closely knit team and a pleasure to be a part of it. We are grateful to them.

ANNEXURES

BAR CHART SHOWING ACTUAL SCHEDULE OF ACTIVITIES



LECTURE NOTES FOR ORIENTATION PROGRAMME SUPPLIED BY IIT

A. ENGINEERS :

<u>Expert</u>	<u>Subject</u>
1. G.S.RAY	- Routine Analytical Technique Followed in Fertilizer Industry
	- Pollution Control in Fertilizer Industry
2. Ali SHAHEED	- Fertilizer Industry
	- Production methods and techniques
3. P.C.DATTA	- Management concepts their application
4. I.K.CHANDRA	- Drawings and tracings for engineers
	- Plant maintenance for engineers
5. Om Frekash	- Instrumentation
	- Electronics and electrical
6. R.RAMADORAI	- Industrial Safety

B. TECHNICIANS :

<u>Expert</u>	<u>Subject</u>
1. G.S.RAY	- Pollution Control in Fertilizer Industry
2. P.K.CHANDRA	- Plant Maintenance
	- Material Selection
3. R.FRASAD	- Handling and Transportation
4. R.RAMADORAI	- Importance of Safety

LECTURE NOTES FOR REFRESHER PROGRAMME SUPPLIED BY IITIL

A. ENGINEERS :

<u>EXPERT</u>	<u>SUBJECT</u>
1. G.S.RAY	- Water treatment - Pollution Control in fertilizer industry
2. R.J.SINGH	- Reformation technology and ammonia synthesis loop. - Ammonium nitrate - Concentrated nitric acid - Nitric acid
3. V.RAMACHANDRAN	- Materials management - Production planning and control in process industry
5. P.C.DATTA	- Personnel Management concepts - PERT/CPM for managers
6. P.K.CHANDRA	- Maintenance planning and control - Materials technology - Turbines, compressors boilers
7. Om FREKASH	- Instrumentation

B. TECHNICIANS :

<u>EXPERT</u>	<u>SUBJECT</u>
1. G.S.RAY	- Industrial water treatment
2. V.K.SINGH	- Safety
3. V.RAMACHANDRAN	- Process equipment operation
4. P.K.CHANDRA	- Bearing and lubrication - Maintenance measurements and tech. drawing

NOTE : Some of the material from the notes for engineers was used for technicians also.

