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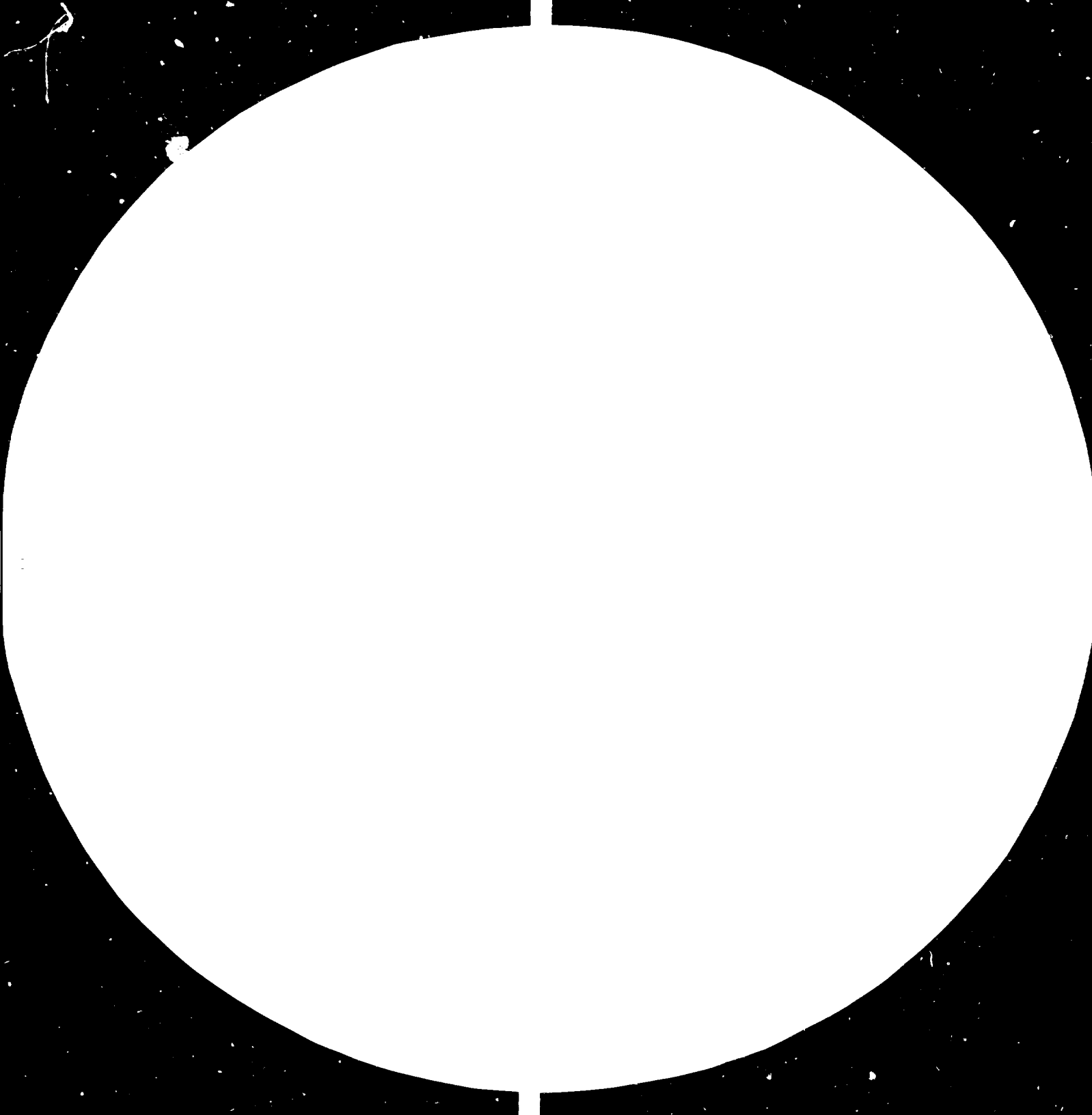
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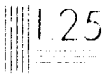
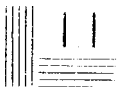
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United Nations Development Programme

Burma EXPANSION OF TRAINING IN PETROCHEMICAL INDUSTRIES

PHASE II (BUR/79/1006)

B U R M A

Project Findings and Recommendations

Terminal Report prepared for

The Socialist Republic of the Union of Burma

by

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Expert of the United Nations Industrial Development Organization

acting as Executing Agency for

the United Nations Development Programme

1982

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1. SUMMARY

- i. One of the immediate objectives of the project, namely to establish a Manpower Planning and Training Department at the Corporate level of the Petrochemical Industries Corporation; has not been fully accomplished due to reasons given in section 3g. item v. page 22. However, the Training Section has been established adjacent to the Syriam Refinery and is very well equipped with audio-visual training aids and training material for all crafts and professions in the Petrochemical Industry. No instructors have been officially appointed by P.I.C. to assist.
- ii. A considerable volume of academic and practical on-the-job training of new recruited R.I.T. and A.G.T.I. graduates, plus employees from the Syriam Refinery has been accomplished, Section 3a and b, pages 7 and 13.
- iii. The Fellowship component of the Project has not been utilised though the potential Head of the Manpower Planning and Training Department, Training Officers of other factories or two specialist Engineers were recommended. Section 3c. page 15.
- iv. Training sections in each of the existing factories do not appear to have been formally established though training is being conducted, particularly at Sale Fertiliser Factory using material supplied by UNIDO.
- v. Considerable assistance by the UN.Expert has been given to the Syrian Refinery Operating and Maintenance Personnel by initiating and implementing training programmes as the need became necessary. Advice and training has, in particular, been given to personnel responsible for the operation of the new Power Plant. Section 3b. page 13.
- vi. The UN.Expert and his Counterpart have had a very full two years work, but there has been insufficient time to complete all the objectives of the project. The reason is partly due to the very intensive workload of P.I.C. Management over the last two years and the non-approval of Nominees for the Fellowship component of the Project. It is therefore strongly recommended that the Project is extended for a further two or three years to bring to a successful completion the objectives as requested by the Government.

2. INTRODUCTION

2a. Project background

The Petrochemical Industries Corporation came into being in March 1972 under the Ministry of Industry. The new Corporation was formed to be responsible for the overall operation of two fertilizer plants. In April 1975 when the Government reorganised the Industries and Corporation, this Corporation was placed under the Ministry of Industry II and took over the two refineries at Syriam and Chauk from Myanma Oil Corporation under the Ministry of Mines. Later in April 1976, the riverine oil transport section from the Inland Water Transport Corporation under the Ministry of Transport and Communications was further attached to the Petrochemical Industries Corporation.

In 1973 the Myanma Oil Corporation planned an expansion of its Syriam Refinery to include additional distillation equipment, a Unifiner/Platformer unit, Hydrotreater, Liquid Petroleum Gas unit and a new Coking unit. It was found necessary to upgrade the skills of the present employees to maintain and operate the greatly expanded refinery when completed and to establish an in-plant training programme to maximise the skills of its operational and maintenance personnel in those areas.

The expansion of the Syriam Refinery was postponed in mid-1975 due to world wide inflation as a result of the 1973 oil crisis.

The need to establish in-plant training and upgrading of skills of the Syriam Refinery personnel was still of paramount importance and in January 1976, UNIDO provided a Petroleum Industries Training Expert under Project BUR/73/015 - Assistance in the In-Plant Training of Refinery Personnel. The project was originally for one year, but was extended for a further year at the request of the Government.

A monthly report on training activities had been submitted to Management; a special Progress Report in July 1977 and a Tripartite Review held on the 14 October 1977. It was

established by the Tripartite Review that considerable achievement had been made in the field of training, particularly on the maintenance side. Operator training had been established at the shift foreman level, but much more formalised on-the-job training was required for the lower levels of operating personnel. A major constraint was the non appointment of a full-time Counterpart to ensure continuation of training on the departure of the Expert.

The Government recognised certain deficiencies in the project but the overall achievements definitely showed the importance of training and the need to expand training in all four plants of the Petrochemical Industries Corporation. As such, the Government requested the extension of the Expert for a further year to institutionalise training for the Corporation. The planning of a new refinery in Central Burma was being finalised to be on stream late 1980 and new employees for operating, maintenance and laboratory work would need to be trained, especially so in view of the process plants being incorporated in the new refinery.

Currently with Project BUR/73/015 was originally planned to run Project BUR/73/016 "Expansion of Research, Facilities and Training of Refinery Personnel". Certain items of equipment to the value of \$25,500 were supplied for the Project by UNIDO, but due to assignment of priorities by the Government Coordinating Agency and the establishment of the Central Research Organization under the Ministry of Industry II, the project was not implemented.

At the Tripartite Review it became apparent that the Government wanted the already approved project DP/BUR/73/016 implemented in 1978, but to use the latter part of the title "... Training of Refinery Personnel". The U.N.D.P. Resident Representative pointed out that this was not possible unless the Government submitted an amendment to the Project Document, originally signed in 1973, to show the change in Government priorities caused by present day circumstances. A sub-committee was formed consisting of personnel from the Petrochemical Industries Corporation Head Office, Syriam Refinery and the U.N. Technical Assistance Expert to draft an amended Project Document and this was completed in November 1977.

The amended Project Document was given the title of "Expansion of Training in Petrochemical Industries" with the objectives of establishing a Training Department within the Corporation, Training Officers in each existing plant and the training of new personnel in addition to continued training of present employees. It was envisaged that approximately 200 Engineering Graduates from the Rangoon Institute of Technology and 165 Associate Government Technical Institute Graduates would have to be recruited and trained to provide new personnel for the existing four factories and the new refinery and fertiliser plants to be built.

In April - May of 1979, a project review mission was undertaken and the following observations results:

1. The project was well accepted by all concerned and had mounted a number of successful training programmes (in which 150-200 engineers/operators had been exposed to training).
2. The PIC had appointed a counterpart to the Expert who, eventually, would be responsible for seeing to it that the training activity became an established and continuing function of PIC (At the moment, however, training was still very much of an ad hoc activity limited - for the most part - to the Syrian Refinery).
3. Trainer-trainees (i.e. training officers for each of the plants) had not yet been appointed. (A training officer was appointed at the Syrian Refinery, but he had since resigned from the Corporation; his replacement and training officers for the other plants had been tentatively identified but not yet appointed.)
4. The project had yet to utilize the fellowship component (approximately 50 man/months). The expert's counterpart could be sent at that time and his nomination had been submitted to the Government. Additional fellowship activity must be postponed until the training officers had been appointed and had undergone preliminary training under the guidance of the Expert.

Thus, to date, the project had been successful - but only partially so. Training had been provided and it had been effective and was generally appreciated. But the objective of the project was to firmly establish the training capability in the Corporation and

this had yet to be accomplished. The project was now at the point where that longer term objective should be seriously addressed.

Since that, further progress has been made in formally establishing a training department at corporate level, Chief Training Officers had been appointed at each plant, and training of the training officers had begun. The C.T.O's underwent preliminary training under the guidance and supervision of the UNIDO Expert and should have been sent abroad on individually tailored fellowships. On their return they were to work with the UNIDO Expert for at least three months in adapting/applying their knowledge and insights in the establishment of the training function in their plants.

Unfortunately the Government Counterpart and the Chief Training Officers did not go for overseas training or were training centres formally established at each of the plants. The Government requested a two year extension to the project, Phase II so that the full objectives could be accomplished.

2b. Outline of official arrangements.

The Project Document BUR/79/006/A/01/37 "Expansion of Training in Petrochemical Industries" was signed on 4 September 1980 by Dr. Maung Shein, Deputy Minister, Ministry of Planning and Finance on behalf of the Government. Mr. Jacob Guijt, Deputy Resident Representative, UNDP Burma signed on behalf of the Executing Agency, UNIDO, on the 31 July 1980 and Mr. Kenneth Watts Resident Representative, UNDP, Burma signed on behalf of the United Nations Development Programme on the 11 September 1980.

The project was for two years and planned to start mid-April 1980, being a continuation of the previous project. Due to the delay in the signing of the Project, the Expert's contract with UNIDO was extended two months to 17 June 1980 and a further contract issued for two years to end 17 June 1982, which would also be the cessation of Field Activities for the new Project.

The Project Document BUR/79/006 had a total UNDP contribution of U.S.Dollars 183,500 and a Government contribution prepared on the 12th.November 1980 of Kyats 285,000.

Five Project Revisions were implemented by UNDP/UNIDO during

the course of the project, which resulted in the last Project Revision E, signed by the Resident Representative on the 4th May, 1982 decreasing the total UNDP contribution to US\$ 168,140. This was to reflect the expenditures in 1981 and the non-implementation of fellowships and non-purchase of vehicle in line with the change in Government policy.

2c. Objectives of the project.

2c i. The immediate objectives of the project were:-

- a. To advise and assist the Management of the Petrochemical Industries Corporation to consolidate the newly established Training Department within the Corporation which had its Headquarters adjacent to the Syrian Refinery.
- b. The Burmese Project Director to be the Expert's full time Counterpart and eventual Head of the Training Department to be trained by the U.N. Expert and also by Overseas training; all to be completed by December 1981.
- c. To advise and assist the General Managers of the existing refineries and fertiliser plants to firmly establish a training section in each plant.
- d. To advise and assist the Chief Training Officers, appointed under the previous Project, in conjunction with the General Manager to identify training requirements, assign priorities, prepare and implement training programmes and where necessary write specific On-the-Job training manuals for Plant Operators and Maintenance personnel.
- e. To advise and assist in the basic training programme established at the P.I.C. Training Centre, Syrian, in the initial training of R.I.T. and A.G.T.I. Graduates covering Chemical, Mechanical, Electric Power, Electronic and Instrument and Civil Graduate Engineers and A.G.T.I. Craftsmen.
- f. To advise and assist the Management of the Petrochemical Industries Corporation on matters directly and indirectly connected with training and operations which would lead to more enhanced economic operation of the various plants.

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g. To advise and assist in upgrading skilled craftsmen to become Technicians.

2c ii. Long range objectives.

The project would initially establish a Training Department at P.I.C. Headquarters with associated manpower planning for all P.I.C.'s operations and also assist in the implementation of Training Sections in each of P.I.C.'s different factories.

When the Department was fully established it would provide P.I.C. Management with detailed records of individual employees training progress and achievements. This would greatly assist in the transferring of employees between plants and provide trained personnel at various levels for new plants as required.

3. Project Activities.

At the commencement of the Project in mid-June 1980 even though it was a continuation of the previous project, the immediate requirement and urgent priority of the Corporation was for the initial training of graduates from the Rangoon Institute of Technology (R.I.T.) and Associates of the Government Technical Institute (A.G.T.I.)

A number of long service Process Operators and Maintenance Personnel had been transferred to the Mann Refinery Construction Project from the Syrian Refinery leaving it short-staffed. In addition new Operator and Maintenance personnel were required for the Start-up and operation in September 1980 of the new 6,000 B/D Distillation Unit, and the new Boiler, 6 MW Steam Turbine Electricity Generator in July 1980.

Specific Training Courses.

3a. Raw Water Treatment for Boiler Operation.

1. 3 R.I.T. Mechanical Engineers, 3 A.G.T.I. and 6 Operators were given lectures on basic water impurities and why these had to be removed for using water in a modern package boiler. Methods used to remove impurities were explained and a detailed description given of the new water treatment plant and operation involving clarification by chemicals, Filtration, Cation and Anion exchangers.

Resin exhaustion and Regeneration principles were also explained.

The course was for five days, full time from 7 July to 12 July 1980.

ii. Power Plant Operators Familiarisation Course.

The course was given by the Electrical Engineer two hours each day throughout June and July 1980 to all Power Plant Operators during the final period of construction. The course consisted of detailed explanation on all the various pieces of equipment and inter-lock electric switches and relays, all of which were completely new to the Operators. Considerable advice and assistance was provided by the UN. Expert.

iii. New Distillation Unit Furnace Operation Course.

The five and a half full time days course was attended by 4 Shift Foremen, 4 Senior Operators, 4 B.E. Chemical Engineer Trainees and the Distillation Chemist from 1 September through 6 September 1980. The course covered the design of the Furnace and construction principles, Tubes, Skin point temperatures, correct oil or gas firing procedures with particular emphasis on the adjustment of the Primary and Secondary Air Registers, in relation to the Stack Damper. The Flue Gas Oxygen Analyser, indications for soot blowing requirements and procedures.

iv. A.G.T.I. Permanent Staff Training Course.

The course started on the 25th. August 1980 with

16 Mechanical Power Trainees

2 Machine Tools and Design (Machine shop Trainees)

1 Electric Power

2 Electronic

and was completed on the 30th. November 1980 when the trainees were assigned to various P.I.C. Factories for further practical On-the-Job training and experience.

The course covered Basic Petroleum Technology, Water Treatment and Boiler Operation and Programmed Instruction study of the basic petroleum and chemical mechanical equipment. For four weeks from the end of September the

trainees were assigned full time to the new Crude Oil Distillation Unit to assist with the final pressure testing of lines, checking equipment and assisting the operators on the start-up of the unit. Valuable experience was gained by the trainees over this period and the trainees worked very hard throughout the course gaining considerable knowledge to apply in the future.

v. Process Instruments Training Course.

This was a special course of four months which started on the 1st. December 1980 with four R.I.T. Electronic Engineering Graduates and one A.G.T.I. to help relieve the acute shortage of Instrumentmen in the Syrian Refinery. The course covered the study of Semiconductors, Power Supplies, Amplifiers, Oscillators and multivibrators, and Logic Circuits followed by three hundred hours study of Pressure, Flow, Level and temperature instrument measurement; types of instruments and basic calibration with practical experience in the Refinery.

vi. Works' Charged R.I.T. and A.G.T.I. Engineering Graduate Training Course.

This course was for those Works' Charged R.I.T. Graduates and A.G.T.I. Graduates who had successfully passed the P.I.C. entrance examination held on 16 March 1980, when a total of 808 Graduates were tested. Lists of successful trainees were submitted to the Ministry of Industry II in July 1980 and approved late December 1980. Notices had to be sent by Personnel Administration to Graduates throughout the country informing them of his/her acceptance and to report to P.I.C. Rangoon for Medical Examination and later to the P.I.C. Training Centre at Syrian. Trainees were therefore arriving at Syrian between 15 January and the end of February 1981.

Details are as follows:-

WORKS' CHARGED R.I.T. GRADUATES

| PROFESSION | No. Approved for employment as Works Charged | No. Reported to P.I.C. having passed the Med. | No. Reported to P.I.C. Training at end Jan. | No. Reported to P.I.C. Training in Feb. | TOTAL in training |
|----------------|--|---|---|---|-------------------|
| CHEMICAL | 35 | 32 | 23 | 9 | 32 (19F 1) |
| MECHANICAL | 39 | 25 | 6 | 12 | 18 (2F 16) |
| ELECTRIC POWER | 1 | 0 | 0 | 0 | 0 |
| ELECTRONIC | 8 | 5 | 2 | 3 | 5 (2F 3M) |
| TOTAL | 83 | 62 | 31 | 24 | 55 |

A.G.T.I. WORKS' CHARGED GRADUATES

| | | | | | |
|---------------------------|----|----|----|---|----|
| MECHANICAL POWER | 62 | 35 | 6 | 2 | 8 |
| ELECTRICAL COMMUNICATIONS | 16 | 12 | 4 | 6 | 10 |
| ELECTRICAL POWER | 4 | 3 | 1 | 0 | 1 |
| CIVIL | 1 | 1 | 1 | 0 | 1 |
| TOTAL | 83 | 51 | 12 | 8 | 20 |

The difference in numbers between those who had reported to P. after passing the medical examination and the number who had actually reported for training was because of R.I.T. and A.G. Graduates who had been employed under short term Contract (3 monthly periods) for the Syrian Refinery Expansion and the Mann Refinery Construction. However at Syrian on completion of the Expansion and start-up of the Units, the last in September 19 they were retained on Contract until becoming Works' Charged and then due to staff shortages could not be released to undergo proper training; a very unsatisfactory situation. The same explanation applied to the Mann Refinery Construction Project

The course started at the end of January 1981 and finished the end of June 1981 when the trainees were assigned to the various P.I.C. Factories. The trainees initially received an indoctrination to P.I.C. and general orientation, followed by lectures on Basic Petroleum Technology, Refining processes and Fertiliser production, Water Treatment, Furnace and Boiler Operation; Pollution prevention and control, and supervised study of Programmed Learning Books according to their profession.

At the beginning of May the trainees were split into groups of four or five for practical On-the-Job training in the Syrian Refinery following a well planned organised programme to enable them to become orientated with all aspects of refining operation; Process units and Laboratory work, General Mechanical maintenance, Instrumentation, Boiler and Electric Power generation. A very successful course for all concerned.

vii. Permanent Staff Course(Bachelor of Engineering)

Sixteen (4 Male and 12 Female) R.I.T. Chemical Engineer Graduates who became permanent staff on successfully passing the written examination of the Public Service Selection Training Board (P.S.S.T.B.) and the personal interview with the Ministry of Industry II, joined the course described in item vi. at the end of January 1981. They studied with the Works' Charged Chemical Engineers Refining Processes and refinery equipment; valves, pumps, heat exchangers, furnaces, instrumentation and automatic valve, and compressors plus the planned On-the-Job training.

viii. Permanent Staff Course (Bachelor of Engineering)

Trainees started arriving at the P.I.C. Training Centre on the 9th. July 1981 and the last by 3 August 1981, but which time there were 27 Mechanical Engineers, 1 Civil and 1 Electric Power. An analysis of the trainees showed that they had Graduated between 1973 and 1979, 6 in 1970 and 8 in 1978 and that ~~two~~^{two}-thirds had been in private business not associated with engineering. For this reason the Petroleum Technology course and Refinery Processes was reduced in time and the training concentrated on Programme

Learning Books and the Mechanical Maintenance Course, which had 10 units with 10 lessons per unit, covering Elements of Mechanics Lubrication, Drive Components, Bearings, Pumps, Piping Systems, Basic Hydraulics, Hydraulic Troubleshooting, Basic Pneumatics, and Pneumatic Troubleshooting. 14 of the Mechanical Engineers managed an overall average score of 60% or better, the top being 82%.

The course was completed on the 17th. January 1982, when the trainees were assigned to the various P.I.C. Factories for more practical On-the-Job training and to gain experience. However, before reporting to the various factories they were all assigned to the four months' Government Training Centre to study Political Science, Civil Law and basic Military Training.

x. Workshop Fitters Training Course.

Discussions with the Maintenance Workshop Supervisor revealed an acute shortage of even semi-skilled Fitters, though there were plenty of untrained Helpers. A course as designed to include:- Measurements, the different kinds of metals and basic properties, screw threads, bolts, nuts and locking devices and the correct use of basic hand tools.

The course started on the 9th. March 1981 with 20 Helpers who had two hours classroom instruction each day. This was followed by supervised practical On-the-Job training covering the overhaul of old valves, pumps and compressors, The course lasted for six months with the P.I.C. Instructor, following which the trainees continued their work under the supervision of the Workshop Supervisor and his Assistant. A very successful course.

x. A.G.TI. Permanent Staff Training Course.

The course started the end of December 1981 when 14 trainees out of a possible 28 approved by the Ministry of Industry II had reported for training. A few more were expected to report during January 1982. The trainees were started on supervised study of the Programmed Learning Books on Safety and Safe Practices to be followed by mechanical equipment and the Mechanical Maintenance Course. The course was scheduled to be completed at the end of May 1982.

xi. Summary of new P.I.C. Trainees.

The Project was a continuation of the previous project "Expansion of Training in the Petrochemical Industries" and at the time of writing this report, January 1982, the following total number of trainees had passed through the P.I.C. Basic Training Courses at the Training Centre adjacent to the Syrian Refinery.

| | R.I.T. Graduate Engineers. | | | A.G.T.I. Graduate Engs. | | |
|----------------|----------------------------|--------|--------|-------------------------|--------|--------|
| | Male | Female | Total. | Male | Female | Total. |
| Chemical | 40 | 43 | 83 | 0 | 0 | 0 |
| Mechanical | 5 | 15 | 80 | 43 | 0 | 43 |
| Electric Power | 13 | 7 | 20 | 14 | 0 | 14 |
| Electronic | 7 | 5 | 12 | 16 | 2 | 18 |
| Civil | 87 | 81 | 8 | 5 | 0 | 5 |
| | | Total | 203 | | Total | 80 |

Original estimates prepared by P.I.C. Management early 1980 for additional Graduates required for the Syrian Expansion, Mann Refinery Project and Sale Fertiliser Expansion Project showed a total of 215 R.I.T. Graduates and 136 A.G.T.I. Graduates. The above figures show that R.I.T. Graduate requirements are nearly completed, but well short for A.G.T.I. Graduates. However, 28 more Permanent Staff A.G.T.I. Graduates were approved by the Ministry of Industry II in November 1981, though only 17 had reported for training at the end of December 1981.

3b. On-the-Job Training

Due to the non-availability of an experienced Training Officer at the Syrian Refinery almost daily visits of one to two hours have been made by the U.N. Expert. This was necessitated to check on the trainees during the various courses and also advise and assist in the On-the-Job training of Operators on the Distillation Units. This was particularly so on the new Distillation Unit with its very modern sophisticated equipment and instrumentation and especially in respect of correct Furnace Operation.

Considerable training of Operators in the new Power Plant has been carried out with full cooperation of the Supervisor (The Electrical Engineer -in-charge). Detailed step by step On-the-Job Training Programmes have been prepared and printed for the Boiler Operator, Steam Turbine Operator and the Control Room Operator. Many hours were spent by the UN.Expert in the Power Plant during the absence of the Supervisor from mid-February 1981 to mid-May 1981. It was found that the operators from the old steam boilers did not understand or appreciate the significance of water analysis results, a very important factor for the operation of a modern 65 tons per hour package boiler. A small steam condensing coil was fabricated and initial analysis showed the steam to contain twenty times the maximum permitted level of Silica (0.02 ppm) for a condensing steam turbine. The Silica level was reduced to an acceptable level in one week by increasing the continuous blow-down and intermittent hand operated blow-down.

A few weeks later a partial loss of vacuum on the steam turbine condenser was found to be due to a partial plugging of the steam ejector orifice by deposited Silica. An inspection of the five stage steam turbine rotor during the first complete turbine overhaul in October 1981 also showed Silica deposits on the low stage (low temperature) turbine blades. Other problems have arisen due to operators not fully understanding the purpose and use of the Ultra-Violet and Infra-Red flame scanners in the Boiler coupled with the various FAIL-SAFE shut down devices.

Prints were made of various articles and given to the Operators concerning Raw Water Treatment and the significance of analysis results, with particular emphasis on chemical dosing of condensate and boiler feed water to remove entrained Oxygen before and after mechanical means by Deairation. Fuel Oil treatment and correct firing practices with special reference to excess Oxygen in the Flue Gas and Fuel Oil/Air ratios were also given to operators.

3c. FELLOWSHIPS.

Overseas training of Burmese Nationals to broaden their minds in the field of industrial training was considered to be a very important part of the Project. Nearly one quarter of the U.N.D.P. U.S. Dollar inputs \$42,000 was budgetted for this purpose, but for reasons unknown to the writer, none of the allocated funds have been used. On the previous Project BUR/73/016, US.\$65,600 was allocated for Fellowships but again was not utilised.

A report was sent to the Managing Director and Directors of P.I.C. on the 19th. June 1980 detailing funds still available from Project BUR/73/016 for 1980 and funds allocated under Project BUR/79/006 for 1980. A further report was sent on the 27th. June 1980 with details of suggested courses for the potential Head of the Training Department, Plant Training Officers, and in view of the modern sophisticated equipment on the new plants at Syriam Refinery, two engineers, one for mechanical equipment and one for instrumentation.

On the 9th. December 1980 eight copies each of duly completed UNIDO Fellowship Nomination Forms were prepared and sent to P.I.C. Management for the Head of the Training Department and the two engineers who would act as instructors on their return. In respect of the two engineers, full cooperation was given by the Mitsubishi Project Manager to the U.N. Expert in advising that they be sent to the actual manufacturers of the mechanical equipment and the instruments and contact addresses given accordingly. The proposed Instrument engineers' training was considered to be very important in view of instrument problems that were developing and no fully trained engineer available to rectify same. This was clearly shown throughout 1981 in respect of the new Power Plant when Conductivity meters, and Recorders and pH meters and recorders failed to function correctly. In addition complete Power Failures have occurred through mal-functioning of the Ultra-Violet and Infra-Red flame scanners on the new boiler, causing a boiler shutdown through the Fail Safe devices.

Throughout the course of the Project to date, letters and Telexes have been sent by U.N.I.D.O. Vienna to the Project Manager via the UNDP Resident Representative to have Fellowship Nomination Forms submitted. Letters have been sent from the UNDP Office to the Foreign Economic Relations Department of the Ministry of Planning and Finance

on the subject matter with copies to the Ministry of Industry II and the Managing Director of P.I.C. The UN.Expert has done his utmost to promote the Fellowships for the benefit of P.I.C. and Burma, but as stated initially, for reasons unknown to the writer, no action has been forthcoming from the Ministry of Industry II.

3d. Visits to other P.I.C.Factories.

The Project Document stated that visits would be made to other P.I.C. Factories by the UN. Expert and his Government Counterpart, to advise and assist the General Manager of the particular factory in the establishment of a training section in the factory and to help the appointed Training Officer. It can be seen from a study of the work done in section 3a, Specific Training Courses, and section 3b, On-the-Job Training, that no time was available to make such visits. It was understood that in November 1981 a request to the Managing Director of P.I.C. was made by the General Manager of Sale Fertiliser Factory for the UN. Expert to visit Sale and advise on the training, for Plant Operators and Maintenance Personnel who were being recruited for the new 210 tons per day Urea Fertiliser expansion project. At the time of writing this report, January 1982, permission had not been granted by P.I.C. Management for the UN.Expert to visit Sale. However, it was suggested that the Government Counterpart should go, but he felt it was unwise in view of the new A.G.T.I. Permanent Staff who were reporting to the P.I.C. Training Centre for Training in December 1981. (Section 3a course x) and no other Training Department Staff available to supervise the new trainees.

3e. UNIDO Headquarters project review mission.

A review of the activities of the project was carried out by Mr. N. Yamamoto, Industrial Development Officer, U.N.I.D.O. Headquarters, Vienna, Austria, Training Section from 11 May 1981 to 15 May 1981. During the course of the mission Mr. Yamamoto had discussion with the UNDP Resident Representative a.i., Lt.Col.Khin OC, General Manager, Syriam Refinery; U Win Pe Han, Counterpart of the project, U Tin Maung Aye, Director of Planning, P.I.C.; U Hlaing Myint San, Deputy Director, Planning P.I.C. and Dr. F. Bah Li, Technical Adviser to the Ministry of Planning and Finance with Daw San Myint, Deputy Director of F.E.R.D. of the same Ministry. Mr. Yamamoto also

spoke with the Trainees undergoing training at the P.I.C. Training Centre and also with Superintendents of the various departments in the Syrian Refinery during his visit. Copies of the final report were sent to the Government, P.I.C. Headquarters and Syrian Refinery in June 1981.

The Findings and Recommendations were as follows:-

- (1) PIC, belonging to the Ministry of Industry II, has 4 refineries (Syriam, Chauk, Malun and Mann which is under construction) and 3 fertilizer plants (Sale, Kyunchaug and Kyawzwa which is under construction), and the project is expected to train key personnel of all these factories. Mr. Allen, UNIDO Expert, has been working very hard to accomplish the objectives successfully together with U Win Pe Han, his counterpart, mainly at the Syrian Refinery, since the Syrian Refinery has training facilities and the Training Headquarters were established at this refinery.
- (2) The project had already trained more than 200 newly employed engineers and technicians, and was training 117 post graduate engineers (chemical, mechanical, electronics, electric power, electric communications) from 19 January to 31 May 1981. This course consisted of 2 parts, e.g. lecture in the morning and on the job training in the afternoon. For lectures the standard text books were lent to the trainees, and periodically a test was undertaken. For on-the-job training, 4 to 6 trainees were attached to each workshop as one group and they moved to workshops one after another on the basis of a schedule prepared by Mr. Allen so that they could get practical knowledge on all fields which they need to study. (~~Annex I~~)
- (3) More than 100 graduate engineers will be trained within the life time of the project (permanent engineers course of 50-60 participants will be held in this autumn)
- (4) Mr. Allen helped the power plant of the Syrian Refinery to solve the problems, which could be considered "on-the-job" training only in the broad sense of the wording.
- (5) Manpower Planning and Training Department has not been established at P.I.C. Headquarters.
- (6) Each factory has not established an efficient training section.
- (7) Three candidates for fellowships were selected by the project in December 1980, but they have not yet been approved officially.

- (8) Concerning equipment, the project does not have any problems after the introduction of field purchase authorization. However, he claimed that he had not received any books under the requisition 80/2 MOD 19-0-4644.
- (9) The mandatory revision of the project document was discussed with Mr. Allen, who would finalize the figures on the basis of these discussions.

Recommendations.

In general, the project has been implemented very well, and Mr. Allen's activities are greatly appreciated by the Government officers concerned (Lt.Col. Khin OO, General Manager of Syrian Refinery and U Tin Maung Aye, Director of Planning, P.I.C.). Considering the remaining duration of the project, I would like to recommend that the following steps should be undertaken as soon as possible.

- (1) It is very important to establish the Manpower Planning and Training Department at PIC Headquarters in order to make a comprehensive manpower development planning and training programme and to check the implementation of these programmes regularly.
- (2) In connection with this Department, a Training Section should be established at each factory with enough staff members and training materials. For them, the training activities at the Syrian Refiner would be a good model.
- (3) In order to carry out the above mentioned (1) and (2), Mr. Win Pe Han's training in the UK for 3 months and for 1 month in India(?) should be arranged urgently, since he is Mr. Allen's counterpart and expected to become responsible for the Manpower Planning and Training Department of PIC, UNIDO needs the nomination forms in order to place him during the life time of the project by the end of August 1981 at the latest.
- (4) Also, Messrs. Than Htaike and Hla Shwe's training for 3 months each in Japan should start as soon as possible in order to avoid more troubles on boiler operation at the Syrian Refinery. The earliest submission of nomination forms to UNIDO is essential to finalize the training programmes. Furthermore, 4 Fellowships each for 3 months should be arranged soonest so that each of them can undertake the responsibility of the Training Section of each

factory after the completion of training abroad.

- (5) Only two instructors (Mr. Allen and U Win Pe Han) worked for one course consisting of more than 100 trainees. This might have forced instructors special workloads.
Therefore, the number of participants of one course should be reduced to 50-60, or one more assistant should be assigned to future courses (who can assist Mr. Allen during U Win Pe Han's training abroad).
- (6) Refresher courses should be organized for senior technicians, who will be selected from operating 5 factories of PIC.
- (7) Considering the timing of the Government actions and the start of 2 factories (Mann Refinery and Kyawzwa Fertilizer Plant) in December 1981 or early 1982, I strongly propose to extend this project for 3 years, which is unofficially supported by Lt.Col. Khin OO and U Tin Maung Aye. Also Dr. F. Bah Li told me that he do not have any objections against the extension under the 3rd. Country Programme if the Ministry of Industry II so requests. The Ministry of Industry II has not yet proposed any projects for 3rd. Country Programme, so he would like to keep about \$400,000 under the reserve projects. This was also supported by Mr. J. Giugt at the meeting of 15 May 1981. (U Tin Maung Aye indicated that PIC would officially examine the achievement and necessity of continuation of the project 6 months before the termination of the present project, which would be in December 1981 or January 1982).

3f. REPORTS.

- i. Throughout the term of the Project a bi-monthly report was written by the U.N. Expert covering all activities and accomplishment. Copies were sent to the Managing Director of P.I.C. and other Directors, the UNDP Resident Representative in Burma and the Head of Training, Division of Industrial Organization of UNIDO in Vienna, Austria.
- ii. Detailed, itemised reports on the achievements obtained by R.I.T. and A.G.T.I. Graduates were submitted to P.I.C. Management on conclusion of the various training courses given in the P.I.C. Training Centre adjacent to the Syrian Refinery.
- iii. The Terminal Report for Project DP/BUR/73/016, Expansion of Training in Petrochemical Industries, after being approved by

by UNIDO, Vienna was sent in July 1980 to the Government and all concerned with the Project.

iv. Two special reports were submitted in July 1980 and February 1981 to show how low cost alterations to the shutdown Distillation Unit C.O.D.'A' could be made to increase Diesel Oil production by a minimum 3,000 gallons per day. This was to be accomplished by extraction of the Diesel Oil in COD 'B' residium by using the Vacuum Unit of COD 'A'. A steam coil was fabricated and installed in one of the Feed Balance Tanks of COD 'A' and an unused pipeline from COD 'B' residium modified and made ready for connection to the Balance Tank. Additional alterations were also made on the Unit but for reasons unknown to the writer the system was never commissioned, resulting in the continued loss of Diesel Oil to Fuel Blend or feed to the Dubbs Thermal Cracking Unit.

v. A report was issued to all Power Plant Boiler Operators concerning Boiler Operation with special emphasis on controlling the Silica content of the produced steam.

vi. At the request of the Director, Planning, an investigation was made by the UN.Expert as to the possible reason which caused the Power Plant to shut down on the 8th June 1981. An analysis of the various flow recorders showed a false continuing Fuel Oil Flow to the Boiler after all pumps had stopped, indicating a plugged High Pressure Orifice line to the Differential Pressure Transmitter. Water filled Seal Pots were fitted during the October 1981 shut-down which, to date, had prevented any further shut down from that part of the operation.

vii. In June 1981 copies of the report on the UNIDO Headquarters Review of the Project conducted early May were sent by the UNDP Resident Representative to Government Officials and P.I.C. Management.

viii. To assist P.I.C. Management in present and future projects copies of the following books, papers and reports published by UNIDO, Vienna were obtained and handed to P.I.C.

- a. Analysis of Microcrystalline wax by Infra-Red Spectroscopy.
- b. The Industrial Uses of Associated Gas- April 1981
- c. Corrosion Problems experienced in Ammonia and Urea Plants.
- d. A Guide to Pollution Control in Fertiliser Plants.

ix. Throughout the course of the Project articles concerning Petroleum Refining Operations and Ammonia/Urea Fertiliser Production as appeared in the Oil and Gas Journal, Chemical Engineering and Hydrocarbon Processing Magazines have been copied and sent to P.I.C. Headquarters and Plant General Managers concerned.

x. A special report for P.I.C. Management was obtained from the U.K., Department of Civil Aviation; on "Aviation Turbine Fuel, Specifications and Tests".

3g. Constraints and Conclusions.

i. Throughout the course of the Project a very considerable volume of academic and practical on-the-job training for new recruited R.I.T. and A.G.T.I. graduates has been accomplished at the P.I.C. Training Centre adjacent to the Syrian Refinery. This has enabled P.I.C. to transfer more experienced, longer service personnel from the existing plants for the start-up of the Syrian Expansion, construction of the Mann Refinery, construction of the Sale Fertiliser Plant expansion and preparatory work for the new Fertiliser Plant to be built at Kyawzwa. However, due to reasons unknown to the writer, delays in approving new Graduates by the Ministry of Industry II has resulted in Graduates obtaining employment with other Ministries and therefore not reporting to P.I.C. after being approved.

In March 1980, 791 A.G.T.I. Graduates were tested by means of a 50 multi-choice answer question paper, out of which 143 were to be recruited and trained over the following two years, to provide sufficient staff for the new P.I.C. Projects. During the course of the present Project a total of only 71 A.G.T.I. Graduates have received initial training in the P.I.C. Training Centre. The total of 71 Graduates comprised 51 Permanent Staff who were therefore Bonded to work for P.I.C. and the Government for 10 years and 20 Works Charged, who unless they became Permanent Staff later were only Bonded to work for P.I.C. for 2 years.

ii. One of the main objectives of the Project was to establish a ManPower Planning and Training Department at the corporate level in the Petrochemical Industries Corporation. The ManPower Planning part has not been established and it is known that in many instances General Managers of the various factories have recruited employees on a casual pay basis to get the work done.

The Training side has been established at the Training Centre adjacent to the Syrian Refinery and is well equipped with Audio-Visual Training aids and instruction material for all crafts and professions. However, with the exception of the UN.Expert's Government Counterpart, no training staff had been allocated by P.I.C. Management, placing a severe work load on the UN.Expert and his Counterpart.

Mention must be made of the 100% cooperation received from Lt.Col. Khin OO, General Manager of the Syrian Refinery and his Supervisory Staff in respect of assistance provided for the On-the-Job practical training of the trainees in the various sections of the Refinery.

iii. Training Officers for the Syrian and Chauk Refineries and the Sale and Kyunchaug Fertiliser Plants were appointed in July 1979 and underwent a very intensive five week training course with the UN. Expert. Training materials were provided and individual employees permitted to borrow the books for study as they required. However, due to the UN.Expert not being able to visit the other factories during the course of the present Project it is not known if training Sections have been established in each factory, as required under the Project Document.

Late October 1981 a request for more training material was received from the General Manager, Sale Fertilizer Plant to assist in the training of 20 or more Industrial Chemists as future Plant Operators for the new Expansion Project. The training was being conducted by a Chemical Engineer with no previous experience as a trainer, though he was shown by the UN.Expert in one day, how the basic Programmed Instruction Books must be used in the correct order, tests administered and marked accordingly.

iv. A major constraint of the Project as requested by the Government has been the non-approval by the Ministry of Industry 2 to permit specific employees to go for overseas training under the Fellowship component of the Project. Details have been given under section 3c of this report, but it must be stated again that this was to be an important factor in respect of a successful completion of the Project.

v. It is known that P.I.C. Headquarters Management have been very heavily involved with overall problems in the day to day operations of the Corporation; the constructions and the delays

with the new Mann Refinery Project and negotiations for the new Fertiliser Plant to be built at Kyawzwa. For this reason it is felt that they have not been able to devote much time to this Project to ensure its successful completion.

4. RECOMMENDATIONS

- a. Based on a very objective analysis and valuation of the foregoing it is strongly recommended that the Project in principle is extended for at least a further two years and a maximum of three years. This is also supported by the UNIDO Headquarters' mission in May 1981. A considerable volume of employee training has been achieved and it would be extremely unfortunate if an extension project was not implemented in view of the effort expended so far, but without accomplishing the main objectives of the project.
- b. It is essential that well prepared Organisation Charts or Plans are prepared for each plant/factory with the known manpower requirements stated for each department.
- c. Detailed department organisation charts should be prepared showing the manpower requirements for each section with salary grades.
- d. Position Descriptions should be written for all Officer grades (K.350 and above) and Job Descriptions for the lower grades. These are essential for:-
 - i. Assuring the non-duplication of positions for similar work in different departments.
 - ii. Providing a detailed document of what is required of an employee which forms the basis for:-
 1. Recruiting
 2. Training, since very few people are fully trained for a particular position on recruitment.
 3. Objective appraisals.
 4. Promotion and Transfers
 5. Salary grade, following a Job Evaluation of the Position Description.
- e. The Manpower Planning Department must be established at the Corporate level, preferably under the Administration Division, with the Head of the Department reporting to the Director of Administration.

- f. Training sections must be officially established in each of the existing factories and the new factories before completion of construction.
- g. Training Officers must be appointed at each factory reporting to the respective General Manager who is responsible for the economic efficient overall operation of the plant by having adequately trained employees.
- h. P.I.C. Management, General Managers of the different factories and Senior Officers must be made more aware of the value of training for personnel under their supervision.
- i. The potential Head of the Manpower Planning and Training Department and Training Officers for each factory should be sent for Overseas Training to become fully acquainted with how industrial training is carried out in developed and developing countries.
- j. It must be appreciated by all concerned that industrial training is a continuing step by step process. All "Supervisors" must encourage and promote the training of their subordinates.
- k. It is recommended that considerable more use is made by senior officers of P.I.C. factories of the management/supervisory development courses offered by the National Vocational Training Programme of the Directorate of Labour in Rangoon. Training Officers should attend those courses on training other personnel before proceeding on overseas training.
- l. In concluding this section of the report it is strongly recommended that considerable thought be given by P.I.C. Management to the statement that AS A LARGE DEVELOPING CORPORATION IT WILL NEVER BECOME FULLY INDEPENDENT UNTIL IT HAS DEVELOPED ITS OWN CAPABILITY in identifying training needs, designing training programmes to meet those needs and conducting its own training programmes. A further two or three years assistance by a UNIDO Industrial Training Adviser would accomplish that objective.

JOB DESCRIPTION

ANNEX A.

DP/BUR/79/006/A/01/37

POST TITLE: Industrial Training Adviser-Petrochemical Industries
DURATION: 24 months
DATE REQUIRED: As soon as possible
DUTY STATION: Syriam, with travel within the country
DUTIES: Working with and through the Government Counterparts, the Expert will assist the Petrochemical Industries Corporation in the design and development of a corporate wide training capability. Specifically he will;

- 1) Assist the management of the Petrochemical Industries Corporation to establish a Manpower Planning and Training Department at the corporate level. The Department would be accommodated in the building specially built for that purpose adjacent to the Syriam Refinery.
- 2) Assist the general managers of the two existing refineries and fertilizer plants to establish training sections in each plant.
- 3) Assist the general managers of each plant to identify the training requirements of their personnel.
- 4) Develop and implement a comprehensive programme of training activities to meet the identified training needs.

QUALIFICATIONS: University Degree in Engineering (preferably Chemical) plus extensive experience in organizing and conducting industrial training programmes in petrochemical industries and experienced in Manpower Planning/Development.

BACKGROUND INFORMATION: The Petrochemical Industries Corporation is responsible for supplying the country's requirements of petroleum products through its Syriam and Chauk Refineries, and fertilizer products through its Sale and Kyunchuang Fertilizer plants.

During the past four years an Industrial Training Expert has been working with the Syriam Refinery in designing and developing its training activities; the last two years of which has been spent in expanding the training programmes to serve the entire Corporation, but a further two years at least will be necessary to accomplish this overall objective.

PETROCHEMICAL INDUSTRIES CORPORATIONPOSITION DESCRIPTION

TITLE: Head of Department

DEPARTMENT: Manpower Planning and Training

DIVISION: Administration

No. of Employees
directly and indirectly supervised: Directly Secretary and Clerk
Indirectly 6 Chief Training Officers

SUMMARY STATEMENT OF PRINCIPLE DUTIES.

Advises and assists the P.I.C. Training Committee on Manpower Planning; recruitment, identifying training needs, setting training objective initiating, developing and implementing training programmes through Plant Chief Training Officers, covering all aspects of the Corporation's operations including Management/Supervisory Development Courses. Maintains a summarised form of all P.I.C. employees' training records.

MAJOR RESPONSIBILITIES AND DUTIES.

1. Performs the duty of Secretary to the Training Committee.
2. Reports to the Committee on progress made in respect of Manpower Planning, recruitment, general training programmes and Management/Supervisory Development Courses and implements the decisions of the Committee.
3. Advises P.I.C. Plant General Managers on Management/Supervisory Development Courses offered by the National Vocational Training Department of the Directorate of Labour. Reviews nominations with Plant General Managers, enrolls selected employees on courses, follows up on progress during the course and after the course on return to duty.
4. Responsible for the recruitment of Graduates from Rangoon Arts and Science University, Rangoon Institute of Technology and the Government Technical Institute, when approval received from the Recruitment Committee and the Ministry of Industry II.
5. Responsible for testing applicants by the use of accepted Attainment, General knowledge and Aptitude tests and the selection of suitable applicants.
6. Arranges for 'works Charged' graduates to take the Public Service Selection Training Board Examination by submitting nominations.
7. Supervises the P.I.C. Indoctrination/Orientation Course for new graduates held at the Training Centre, Syrian Refinery. Arranges for lectures to be given covering P.I.C. Organisation, Administrative policies and procedures, Basic Petroleum Technology, Petrochemical Industries mainly in respect of Fertilizer production and and Environmental Pollution Courses and Control. Personally give

lectures on appropriate subjects.

8. Advises and assists the Chief Training Officers in P.I.C.Plants on the implementation and follow-up on training courses which include individual and group employee programme learning and instruction; the writing of job contents and on-the-job training programmes; Fire and Safety Training Courses, Management/Supervis Training Courses.
9. Maintains a summarised form of all P.I.C. employees' training progress and records.
10. Reviews all requests from Plant Managers for Graduate Officer replacement or new positions and recommends suitable employees, based on training accomplishments, progress and personnel attributes, to the P.I.C. Training Committee for decision on possible transfers, so as to make the most effective use of an individual's skills and capabilities.
11. Translates into Burmese specific items and articles from English printed journals applicable to furthering training programmes.
12. Assists the U.N.Expert throughout the period of the U.N.Project DP/BUR/79/006, "EXPANSION OF TRAINING IN PETROCHEMICAL INDUSTRIES in all aspects of setting up at Corporate level the Manpower and Training Department and to ensure its continuation on the departu of the U.N.Expert.

AUTHORITY AND SCOPE

Originates and recommends training programmes to Plant Managers and the Training Committee and when approved, is responsible for their implementation and administration in conjunction with Plant Chief Training Officers.

Personally conducts indoctrination/orientation courses for new hires and Management/Supervisory Courses for Officers of P.I.C.Plants.

EXPERIENCES AND KNOWLEDGE.

The incumbent should have at least ten years experience covering the theoretical and practical operation, where possible, of Petroleum and Petrochemical Industry process units. He should be fully conversant with Burmese Labour Laws and P.I.C. Personnel Policies and Procedures. He must be able to meet and deal with people, be fluent in written and oral communication, both in Burmese and the English languages, proven supervisory ability and dedicated to the training of employees in the interest of the Corporation and Country.

ANNEX C

EQUIPMENT SUPPLIED BY UNIDO in Addition to that
of the previous Project, as of January 1982.....

| | <u>COST</u> | <u>US\$</u> |
|--|-------------|-------------|
| 1. CANON COPIER SPARES | 1,206 | |
| 2. PEABODY OIL BURNER TIPS | 386 | |
| 3. A.C.SPARES | 1,839 | |
| 4. OXYGEN FLUE GAS ANALISER | 1,060 | |
| 5. BOILER ANALISER | 407 | |
| 6. WATER ANALYSIS TEST KITS & CHEMICALS | 1,066 | |
| 7. GESTETNER DUPLICATER AND SPARES | 1,800 | |
| 8. HEAT EXCHANGER TUBE EXPANDERS | 662 | |
| 9. AIROIL BURNER TIPS | 520 | |
| 10. OVERHEAD PROJECTION EQUIPMENT | 622 | |
| 11. DEHUMIDIFIERS | 500 | |
| 12. GAS CHROMATOGRAPH SPARES | 1,208 | |
| 13. TRAINING BOOKS,PROGRAMMES AND LITERATURE | 10,714 | |
| | <hr/> | |
| TOTAL: | 21,990 | |

