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REPORT

on Mission to

Rangoon, Burma

between 2 and 11 March 1971

by

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Chief
Fertilizers, Pesticides and
Petrochemicals Industries Section
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Field Adviser (UNIDO)
Bangkok

Bangkok 11 March 1971

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I. Introduction

1. This report covers the mission of M.C. Verghese and Nils Ramm-Ericson to Burma between 2 and 11 March 1971 (in the case of Nils Ramm-Ericson: between 2 and 7 March only). The mission was a follow up of Nils Ramm-Ericson's visit to Burma in December 1970 /see report no. BKK/52(70)/ and was subsequently requested by the Government.

2. The primary objectives of the mission were as follows:

i). to collect background information for assistance needed in the manufacture of wood preservatives from refinery by-products (discussed under item III of this report)

ii). to discuss and finalize the phase I of the request in establishing a Polymer Research Laboratory (discussed under items II of this report)

iii). to confirm locations, facilities and space available for the project under execution namely Supply and Use of the Universal Process Trainer and the Universal Laboratory Pilot Plant OA 321 BUR(3) and OA 321 BUR(2) (discussed under item III of this report)

3. A very comprehensive programme, including a visit to the Myanma Oil Corporation's refinery at Syriam, was prepared by the UNDP Office in collaboration with the Ministry of National Planning. At the UNDP office discussions were held with the Resident Representative, Dr El Maraghi and the Administrative Officer, Mr. Surani. U Tun Win, Government Liaison officer at the UNDP office accompanied the mission at the various meetings with Government officials.

4. A list of the persons met with and the industries and institutions visited is appended as Annex II. Also appended - as Annex III - is a listing of the titles and dates of various expert reports, available at the UNDP office, in the field of industry.

5. In Annex IV a list is given showing the names and addresses of selected Government officials to whom it is recommended that the UNIDO Newsletter and other relevant UNIDO publications be sent. Some of them, like Dr. Ba Hli, Director General of the Union of Burma Applied Research Institute (UBARI), already receive the Newsletter, and would appreciate to receive other specialized documentation in their respective fields.

4/In.....

6. In this connexion it might be mentioned that specifically useful follow up contacts were made with two Burmese participants in earlier UNIDO seminars namely, U Tin Maung Aye, Refinery Manager (Chauk refinery) who participated in the Petrochemical Symposium at Baku, USSR, in October 1969 and U Thein Win, Project Manager (Insecticides Formulation Plant Project) who took part in the Pesticides Training Course at the Syracuse University in New York in August 1969. It is recommended that a systematic follow up with documentation and personal contacts be made during UNIDO staff and experts missions as well as during the visit of the field adviser with former fellows and participants in UNIDO meetings from the country.

7. The various technical assistance proposals discussed by the mission were reviewed at a meeting with the Deputy Secretary of the Ministry of National Planning, U Chein Hai (who is also co-ordinating authority for technical assistance).

8. Latest information was given to U Chein Hai regarding the UNIDO Special International Conference in June as directed by the Executive Director of UNIDO and the desirability of getting comments from the Government of Burma before the Conference as well as high level representation at the Conference were stressed. A copy of the latest UNIDO Aide Memoire (no. 6) and press releases IDO/281 and IDO/288 on this subject were handed over to the Deputy Secretary.

9. Dr. El Maraghi the UNDP Resident Representative indicated that the UNDP Country Planning exercise would probably take place some time before the end of 1972. It is expected that the new 4-year Development Plan of Burma will be prepared during 1971 /see para. 7 of Ramm-Ericson's report on his visit to Burma in December 1970; report no. BKK/52(70)/. Particular note was taken of the fact that the SIS programme, now being outside the UNDP country target allocations, would remain a separate source of finance, not included in the respective countries' planning targets, although deriving from the UNDP Revolving Fund. (Document DP/GC/Field/219/Add.1 of 24 October 1969).

10. The fact that as yet no Burmese national had participated in the Seminars on UNIDO Operations was discussed with the authorities concerned. We were led to understand that the Industrial Development Co-operation (IDC) had been prepared to send one officer but that it was desired that an officer also from another agency be sent. As the UNIDO invitation was only for one officer it was decided at ministerial level not to send anyone at this time. We therefore recommend that for the next Seminar on UNIDO Operations in October/November 1971 the Government of Burma be invited to send two participants. (Most other countries have already had 3-4 participants at this Seminar).

11. The next visit by the UNIDO Field Adviser was suggested to take place in about six months time. Among others, U Ba Chit, Deputy Director (Planning) of IDC and Dr. Ba Hli, Director General of UBARI expressed interest in such timing as it could be expected that, by that time, further technical assistance possibilities might be taken up for consideration as well as a consolidation of the present ones. Specific attention should be given to UNIDO's various training programmes.

5/Considerable...

12. Considerable interest and enthusiasm was shown by the Federation's administrative heads of the different corporations and institutes visited during the mission for receiving future UNIDO technical assistance.

11. The Union of Burma Applied Research Institute (UBARI)

13. The mission held several discussions with Dr. Ba Hli, Director General of UBARI and his staff. Although the mission raised the question of possible UNIDO assistance in various fields in which UBARI was active, such as metallurgy and pulp and paper technology, we were invited (and rightly so) for the present moment the Institute wished to concentrate (as far as technical assistance was concerned) on the establishment of the polymer research laboratory.

14. However, the staff of the Institute was keenly interested in obtaining literature and UNIDO documentation concerning their respective fields. We recommend that the complete list of available UNIDO documentation be sent to Dr. Ba Hli (see para. 4 above). The Head of the Cellulose and Paper Research Department, Dr. Mai Aung gave us a copy of some of his research reports.* These are being sent to Mr. Siddiqui, under cover of our letter of 12 March 1971, simultaneously with this report.

15. Dr. Mai Aung had been following up on the Feasibility Study for the Establishment of a Hardboard Plant based on Bamboo made under Colombo Plan auspices by the Canadian consulting engineering firm Stelfer-Hurter which had been completed in 1964. The implementation of the project was to be considered only after some experience, as far as the supply and price of the raw material - bamboo - had been gained from the new paper factory project at Ela for which bamboo is to be used. Presently, Dr. Mai Aung and his officers were testing the country's various hardwood species as for its suitability for mixed pulping.

16. The proposal for assistance in the establishment of a polymer research laboratory was discussed in detail and the draft project data sheet and job descriptions prepared at UNIDO Headquarters were elaborated on. The thus modified project data sheet and job descriptions for the expert team are appended as Annex V A, V B, V C and V D. A formal request under SIS, for an advisory and preparatory mission, attaching the project data sheet and job descriptions, was expected to be formally submitted to the Resident Representative by the Ministry of National Planning soon.

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* "Pulp from stored bamboos" by U Mai Aung, Daw Khin Htway and U Kyaw Zaw. UBARI Report 141/1/1968.

"Bleaching of bamboo mechanical pulp - part I" by U Mai Aung, Daw Khin Htway and U Sein Khaing. UBARI Report 142/2/1968.

"Bleaching of bamboo mechanical pulp - part II" by U Mai Aung and U Sein Khaing. UBARI Report 146/6/1968.

"Mixed pulping of bamboos grown in Pegu Yoma - Part I" by U Mai Aung and Daw Khin Htwe. Paper at First Burma Research Congress 24.3.66

"Mixed pulping of bamboos grown in Pegu Yoma - Part II" by U Mai Aung, Daw Khin Htway & U Kyaw Zaw. Paper at Second Burma Research Congress 22.3.67.

Still another report is expected to be ready by July regarding pulp of different species of hard wood and bamboo.

6/The .....

17. The question of investigating the "urylon" synthetic fibre developed in Japan was discussed. This development is only at pilot plant stage but UBARI is interested in this fibre as it is based on urea. Burma is building two fertilizer plants each with a capacity of 210 tons/day of urea as a fertilizer. Although at present no provision exists in the factories to produce technical grade urea, this can easily be added. Therefore UBARI rightly felt that developments in Burma in synthetic resins should be based on urea - formaldehyde and melamin type resins. Synthetic fibres based on urea should also be studied and developed if possible.

or

18. Training research personnel before phase II of the proposed SF assistance starts was discussed. It was suggested that before phase II is requested and sanctioned as a SF project, fellowships could be made available for training for short periods in well-known polymer research laboratories of qualified personnel. During the execution of phase II fellowship training will form an integral part of the SF project. It was also pointed out the since the trained personnel will have to work with experts assigned to the project during its life, the training abroad can be for a duration of six months to one year only.

19. The facilities of the UBARI as it exists today were inspected. The buildings have been put up by U.S.A. AID funds. There is adequate space and facilities for the established departments such as Metallurgy and Geology, Physics and Engineering, Applied Chemistry, Ceramics, Analytical Chemistry, Instrumentation, Technical Information, Standards and Specification and Atomic Energy. About 50 scientists work in these departments assisted by other staff of about 250. There is no top scientist at present experienced in polymer research. But it was pointed out that two key men with high degrees in chemistry could now be deputed for this work. Later, qualified men with at least masters degree in chemistry and chemical engineering could be recruited and trained. The UBARI works in close collaboration with the universities and engineering institutions.

20. The mission advised UNIDO Headquarters (cable no. 80 of 6 March to Mr. Siddiqui) to transmit soonest to the Resident Representative for advance Government clearance the cvis of Dr. Herbert May (UNIDO staff member), Dr. Braunsteiner and Professor Kaufman who were suggested for the expert team. It was hoped that it would be possible to send the team in April or May this year.

III. The Myanma Oil Corporation (MOC)

21. The mission held discussions at the Headquarters of the Myanma Oil Corporation (MOC) twice with Comdr. Aung Thein (Burma Navy) Officer on Special duty, U Tun Myint, Administrative Manager, U Tin Maung Aye and the Director Dr. U. Aung Khin and visited the Syram Oil Refinery for a full day and met U Tin Maung Aye, Refinery Manager and other senior officials. Discussions were also held with Mr. Edmund Riba who is finishing a two year assignment with the Refinery as an Oil Refinery Expert backstopped by the Natural Resources and Transport Division of UN Headquarters. The working and organization of UNIDO were explained to key personnel as well as the kind of assistance that could be provided was indicated.

7/As.....

22. As the Government and MOC had already expressed interest in the recovery of naphthenic acid from refinery products, the subject was discussed in detail and preliminary analyses of refinery products for naphthenic acid contents were handed over to the mission (Annex VI-C) Data on import of creosote and other wood preservatives was also given (Annex VI-D). It was pointed out that in order to render assistance quickly one of the senior staff members of UNIDO (Dr. P. Brandt) who is an expert on wood preservatives and pesticides could make a visit for about four weeks to Burma. He could also assist the Industrial Development Corporation (IDC) and the Burma Pharmaceutical Industries (BPI) in setting up a project for extraction of nicotinic acid from tobacco waste and reassess the proposal for a pesticides formulation plant. A draft job description was prepared and handed over to MOC authorities. (Annex VI A).

23. During the discussions at the Syriam Oil Refinery and with Mr. Riba it was observed that several problems on which the refinery is working and the future plans of MOC have not been solved or fulfilled. Problems were connected with replacement of obsolete equipment and processes, transport of naphtha for export, shortage of make-up water, putting to full use instruments for analytical work, training etc. Plans of MOC under current consideration are:building/a one million ton/year capacity refinery, production of ethylene for polyethylene, installation of plant for narrow boiling range fraction and the lubricating oil blending plant. It was considered extremely useful if assistance could be obtained of a petrochemical and oil refinery planning expert for follow up on the above. A draft job description was prepared and handed over to MOC authorities (Annex VI B).

/of

24. The facilities for installing the universal process trainer (UNDP/TA 70/11) and the universal laboratory pilot plant (UNDP/TA 70/12) being supplied by UNIDO were inspected. It was found that a large hall has been conditioned for installing the universal process trainer where a large number of trainees can take part in the course - provision of water and electricity have been made. As regards the universal pilot plant a room has been set apart for these equipments. Both arrangements were found to be satisfactory.

25. In this connexion, the over all needs for training both for operational and maintenance personnel at the Syriam Oil Refinery was discussed. A new building to house the training centre is being constructed. There are existing facilities to house about 25 trainees although this has to be augmented. As the plans for building the new refinery is finalized and possibilities of petrochemical plants come up, training is assuming vital importance. The universal process trainer and the universal pilot plant being supplied by UNIDO will form the nucleus for the training programme. Further assistance in the programme could be extended by UNIDO. It was also mentioned that UNIDO is conducting a training course in plastic fabrication, standardization and testing in Vienna in June this year and probably next year. An expert could be sent to next year's course. Three nominations have been submitted by the Government through the Resident Representative (Mr. M.A. El Naraghi's letter of 19 February 1971 to Mr. Haug) for UNIDO fellowships in petrochemical technology under the Regular Programme:

8/a).....

a) U Win Myint B.SC (Chem. Eng.)
Production Engineer
Plastic Factory

b) U Thein Win B.SC (Chemistry)
Deputy Manager
Petrochemical Industry Project

c) U Chn Kyow B.E. (Chemical)
Industrial Officer
Chemical Industry Management.

UNIDO has to take early action for the placement of these candidates for training.

26. The Director of IDC, Dr. U Aung Khin, expressed interest in UNIDO's assistance to set up a gas analysis laboratory in the training centre of the Nynama Oil Corporation.. He said this facility would be used to analyse and control new gas finds in Burma as well as for training purposes. He said a request for assistance to provide equipment and experts for this laboratory will be processed.

IV. The Industrial Development Corporation (IDC)

27. The mission met with the Deputy Director (Planning), U Ba Chit, and several of the staff of IDC. Several areas in which the Government was potentially interested in possible UNIDO assistance were discussed. Great interest was shown in possible assistance in the field of repair and maintenance and spare parts manufacture. Thus we were informed that since Ramm-Ericson's visit in December last year the Ministry of Industry had formed a Special Committee on Repair and Maintenance. The Chairman of this committee was Lt. Col. San Khin who also took part in the discussion at IDC. The draft job description for a mechanical engineer to undertake an Exploratory SIS Mission on Repair and Maintenance which had been prepared at UNIDO Headquarters* was discussed and generally agreed to. However, it was felt that the Committee was not quite ready yet to fully utilize such a mission and would as a first step prepare background material with the intention of requesting an exploratory mission in the near future. In particular, the textile industry** seems to be in need of facilities for repair and spare parts manufacturing.

28. During the first meeting in IDC discussions were held with retired Col. Thein Htaik, Chairman for pharmaceutical project and U Thein Win Project Manager, insecticides formulation plant project. It was mentioned that chlorinated products like DDT and BHC which were once actively considered to be produced locally have been shelved due to their being banned

* The draft job description was transmitted to Dr. El Maraghi on 29 January 1971, who in turn had sent it to the Government authorities (on 8 February).

** We are transmitting to Mr. Siddiqui under cover of our letter of 12 March 1971, a copy of the report entitled "Practical Advice an improved Management of Textile Mills in the Union of Burma" by Dr. Ing Ebehard Schaefer dated August 1963.

9/in.....

in developed countries owing to their residual and environmental pollution effects. The formulation plant which was actively considered and which would have cost about two million dollars in foreign exchange is also held in abeyance. Interest was shown in the extraction of nicotinic acid from tobacco waste. It was pointed out that if Mr. P. Brandt comes to Burma in connexion with the wood preservative project he could assist in reassessing the formulation project as well as draw up a project for the nicotinic acid extraction. These have been included as terms of reference for the wood preservative and pesticides expert (Annex VI A). The officers requested additional information from UNIDO on DDT and BHC and the details on the work which the FAO/WHO Committee is doing in drawing up tolerance limits for these products.

29. During the second meeting with the Deputy Director (Planning) U Ba Chit the assistance being extended by UNIDO to different countries for the fertilizers and pesticides industries was explained. In the case of fertilizers, for plants coming into production, UNIDO could assist in drawing up organization charts, training of operational and maintenance personnel, developing a marketing organization, translating operational maintenance and safety instruction into local languages, assist in setting up preventive maintenance schedules, fixing minimum and maximum supply of spare parts and act as liaison between contractors and the government. It was explained that the production of urea from the two projects now under construction will be taken over by the Agricultural Rural Development Corporation (ARDC) for distribution. The other areas of assistance were of interest to IDC and they will approach UNIDO in due time. With regard to the field of pesticides, the work being done by UNIDO in setting up a pyrethrin project in Rwanda a nematocide project in UAR and the mission for "Mirex" production in Brazil and the survey to utilize excess chlorine capacity in Latin America were explained. The authorities showed interest in utilizing the excess chlorine available from the caustic-chlorine project being put up in connexion with the paper mill.

V. Conclusions and Recommendations

30. It is essential that key people in Government and industry receive regularly UNIDO Newsletter and relevant publications.

31. It will be useful to maintain an up-to-date list of titles and dates of various experts' reports in the field of industry in the Resident Representative's office.

32 It is recommended that during UNIDO staff members' or experts' missions as well as during the field adviser's visits contacts be maintained and continued with former fellows and participants in UNIDO meetings.

33. The Union of Burma Applied Research Institute (UBARI) is doing very useful work and the request for setting up a polymer research laboratory which will be most useful to develop the industry be favourably considered by UNIDO by sending a three member expert team as phase I of the project with Mr. H. May staff member of UNIDO as a team leader.

10/The .....

34. The Myanma Oil Corporation (MOC) and the Syriam Oil Refinery are needing assistance in the production of wood preservatives. It is recommended that the senior staff member, Mr. P. Brandt from UNIDO be sent for a mission for a four week period. The services of a petrochemical and refinery planning expert should be provided as a follow up of assistance already rendered.

35. During Mr. Brandt's mission assistance be given to Industrial development Corporation (IDC) for reassessing the pesticides formulation project as well as drawing up a project for production of nicotinic acid from tobacco waste.

36. In the future there may be room for assistance to the fertilizer industry, the pesticides industry and the petrochemical industry, particularly plastics fabrication. This should be followed up during the field adviser's future visits.

37. As and when the Government decides to request services of ar expert for an exploratory mission on maintenance and repair (mechanical engineer) UNIDO should provide the assistance expeditiously.

38. In the field of training the following are considered essential:

a) strengthen the Training Centre being organized at the Syriam Oil Refinery. Assistance will be requested for setting up a gas analysis and training section;

b) provide fellowship training for three fellows under petrochemicals already nominated by the Government;

c) the expert in UBARI on pulp and paper be invited for future meetings on the subject;

d) two fellows be invited for the seminar on UNIDO operation in October/November 1971;

e) an expert to be invited to participate in the Second Inter-regional Fertilizer Symposium Kiev and New Delhi September/October 1971.

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3. Description of the Project:

[illegible] two [illegible] to the chief of section of [illegible], Petroleum and Petrochemical [illegible] of Mild and the field [illegible] with [illegible] to the technical [illegible] together [illegible] and to [illegible] necessary and decide [illegible].

4. Project Budget:

Expert :	Period :	[illegible] :
1 UNIDO [illegible]	[illegible]	[illegible]

5. Project approved:

[illegible]

[illegible]

[illegible]
[illegible]

Annex I

List of persons met with and institutions visited during the present mission

Ministry of National Planning

U Thein Hai, Deputy Secretary

Union of Burma Applied Research Institute (UBARI)

Dr. F. Ba Hli, Director-General
U Kyaw Myein, Director, Technical
" Htay, Director, Administration
U San Yu, Secretary (Burma Research Board)
U Than Myint, Sr. Research Officer (Food)
U Kyaw Thaung, " _____" (Applied Chemistry)
Dr. Tai Maung, " _____" (Paper)
Dr. Maung Maung, "_____" (Pharmaceuticals)
Dr. Myint Maung," _____" (Chemical Analysis)
U Kyaw Myun, " _____" (Chemical Analysis)

Ministry of Industry

Industrial Development Corporation (IDC)

Lt. Col. San Khin
Officer-on-Special Duty

U Ba Chit
Deputy Director (Planning)

U Khin Maung Kyo
Planning Engineer

U Than
Planning Engineer

U Kyaw Thaung
Industries Officer

U Than Win
Industries Officer

Retired Lt. Col. Thein Pe
Chairman for Pharmaceutical Project

U Thein Win
Project Manager
Insecticides Formulation Plant Project

Ministry of Mines

Kyanma Oil Corporation (MOC) (both the head office at Yenangyaung and the refinery at Syriam were visited,

Director U. Aung Khin

Comdr. Aung Than, Officer on Special Duty

U Tun Kyint, Administrative Manager

U Tin Maung Kyee, Refinery Manager at Thanlyin Refinery

U Kyaw Thein, Refinery Process Superintendent

U Kyint Thein, Research Chemist

U Aung Kyi Soe, Chief Engineer

Mr. A. Kiba (OTC) Petroleum Refining Expert

Mr. Hunter Kosnitzki (F.A.O), Technical Liaison Officer, Pyun Khaung fertilizer plant.

United Nations Development Programme

Dr. Al Lanzoni, Resident Representative
Mr. A. K. Surani, Administrative Officer

U Tun Min, Liaison Officer

U Ba Aung, Sr. Admin. Assistant

Annex III

Selected list of titles and dates of expert reports in the field of Industry available at the UNDP office, Rangoon.

REPORTS ON THE INDUSTRIAL SURVEY MISSION TO BURMA 1963:

INTERIM REPORT NO. 1: CURRENT PROBLEMS & DEVELOPMENT NEEDS OF BURMA'S INDUSTRY: J.W. Bartelds, Director, UN Industrial Survey Mission.

REPORT ON INLAND NAVIGATION & INLAND SHIPBUILDING IN THE UNION OF BURMA: A.H. Hummel

INTERIM REPORT NO. 3: FEASIBILITY STUDY OF FISH MEAL AND FISH OIL PRODUCTION - H.M. Friend

CHEMICAL AGRICULTURE BASED INDUSTRIES IN UNION OF BURMA: A. Eisenloeffel

PROVISION OF FERTILIZERS FOR THE UNION OF BURMA: A.G. White

REPORT ON ALUMINIUM ROLLING INDUSTRY IN UNION OF BURMA: H.E. Cooper

FEASIBILITY STUDY OF FISH MEAL AND FISH OIL PRODUCTION IN UNION OF BURMA: H.M. Friend

FRUIT JUICE, PALM WINE AND AROMA CONCENTRATES IN UNION OF BURMA: H.M. Friend

FOOD CONTROL & INSPECTION IN UNION OF BURMA: H.M. Friend

PRACTICAL ADVICE ON IMPROVED MANAGEMENT OF TEXTILE MILLS: E. Schaefer

INDUSTRIAL ZONES IN UNION OF BURMA: H. Forsyth

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"A Survey of the Mineral Fertilizer Requirements of Burma and recommendations for the construction of a Nitrogen Fertilizer Forestry prepared by FAO-team of experts (Mr. S.M. Shtefan et. al.) (in 1961-62)

List of Selected Government and other officials to receive UNIDO Publications.

DR. F. BA HLI
DIRECTOR GENERAL
UNION OF BURMA APPLIED RESEARCH INSTITUTE
KABA AYE P.O., RANGOON

MAJOR MAUNG 'HN
EXECUTIVE DIRECTOR
INDUSTRIAL DEVELOPMENT CORPORATION
KABA AYE P.O., RANGOON

U BA CHIT
DEPUTY DIRECTOR (PLANNING)
INDUSTRIAL DEVELOPMENT CORPORATION
KABA AYE P.O., RANGOON

U THEIN WIN
PROJECT MANAGER
INSECTICIDES FORMULATION PLANT PROJECT
INDUSTRIAL DEVELOPMENT CORPORATION
KABA AYE P.O., RANGOON

U TIN MAUNG AYE
REFINERY MANAGER
MYANMA OIL CORPORATION
CHAUK

U THAN WIN
REFINERY MANAGER
MYANMA OIL CORPORATION
SYRIAM

U HLA MYINT
CHIEF EXECUTIVE OFFICER
AGRICULTURAL AND RURUAL DEVELOPMENT CORPORATION
YUZANA YEIKTHA, NATMAUK ROAD, RANGOON

U CHEIN HAI
DEPUTY SECRETARY
MINISTRY OF NATIONAL PLANNING
SECRETARIAT, RANGOON

CAPTAIN BA MAUNG CHAIN
OFFICER ON SPECIAL DUTY
MINISTRY OF INDUSTRY
SECRETARIAT, RANGOON

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Annex V A

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNITED NATIONS DEVELOPMENT PROGRAMME

Special Industrial Services

Project Data Sheet

1. Country : Burma

Project title : Establishment of a polymer research laboratory

Government Department submitting request : Ministry of National Planning

Specific Government Agency concerned with the project : The Union of Burma Applied Research Institute (UBARI)

2. Description of the project: A team of three experts, namely a polymer chemist/chemical engineer (thermosetting resins), a polymer chemist (thermoplastics) and a synthetic fibre technologist, will visit UBARI for a period of three weeks. They will prepare, in consultation with the authorities, a detailed project proposal including:

(a) detailed specifications regarding buildings, space, utilities requirements for the establishment of a polymer research laboratory,

(b) a proposed polymer research programme;

(c) a list of laboratory and pilot-scale equipment required to carry out the research programme;

(d) recommendations for training of local personnel;

(e) technical assistance requirements under UNDP (Special Fund)

One of the team members will be required to visit Japan to assess the development of urylon (a urea-based polymer).

3. Summary of major grounds for request: The demand for plastics and synthetic fibres based on petroleum sources is increasing rapidly in Burma. Naphtha and many other raw materials which can form a base for petrochemical and polymer industries are available within the country and, therefore, serious consideration is being given to develop these industries in the near future. The Government has therefore decided to set up a polymer research laboratory at UBARI with the purpose of training polymer scientists and technologists and conducting services to the polymer industries.

4. Relationship with other technical assistance projects or requests: Nil

5. Project components and duration:

Field of activity Experts	Duration
Polymer Chemist/Chemical Engineer (thermosetting resins)	3 weeks
Polymer Chemist (thermoplastics)	3 weeks
Synthetic Fibre Technologist	3 weeks

Annex V 3

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

6 February 1971

Request from the Government of Burma
for Special Industrial Services

DRAFT JOB DESCRIPTION

POST TITLE	Polymer Chemist and Chemical Engineer (thermosetting resins)
DURATION	Three weeks
DATE REQUIRED	As soon as possible
DUTY STATION	Rangoon
PURPOSE OF PROJECT	The Government desires assistance in establishing a Polymer Chemistry Research Laboratory at the Union of Burma Applied Research Institute (UBARI) to serve industries using plastics and synthetic fibres.
DUTIES	The expert will be a member of a team of three experts, the other two being a polymer chemist (thermoplastics) and a synthetic fibre technologist to be assigned to UBARI. He will be expected to carry out the following:

(1) in consultation with appropriate authorities to draw up a programme of research on the production of thermosetting resins such as urea-, melamine-, phenol-formal dehyde and unsaturated polyesters;

(2) to advise on the various possible industrial uses of the synthetic resins in the plastics, adhesives, paints, textile and paper industries utilizing a conbination of synthetic resins and domestically available agriculture and forestry products;

(3) to make recommendations for training of local personnel

(4) to advise on specifications for laboratory buildings, space, utilities and equipment requirements (including pilot scale) related to thermosetting resins.

(5) to assist in drawing up a draft Special Fund Project as phase II.

QUALIFICATIONS	University degree preferably with Ph.D. in polymer chemistry and extensive research and development experience in the polymer industry.

LANGUAGE English

BACKGROUND INFORMATION

UBARI established by the Government in 1954 is responsible for carrying out industrial research under the Ministry of National Planning. Present research activities include metallurgy, ceramics, food, pharmaceuticals, cellulose, applied chemistry, physics and engineering. These fields are backed by supporting services such as analytical, instrumentation, standards and information. With abundant natural resources (natural gas and wood) as well as basic petrochemical production being planned in the near future, the Government plans to establish a polymer research laboratory at UBARI to conduct a programme of work in plastics and synthetic fibres, the domestic demand for which is increasing rapidly. The laboratory will be built shortly. In the course of the next five years, the laboratory intends to train local scientists and engineers in polymer science, and plastics and synthetic fibre technology, to conduct technical services to industry and to lay sufficient groundwork so that research projects compatible with local conditions are started.

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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

6 February 1971

Request from the Government of Burma
for Special Industrial Services

DRAFT JOB DESCRIPTION

POST TITLE	Polymer Chemist (thermoplastics)
DURATION	Three weeks
DATE REQUIRED	As soon as possible
DUTY STATION	Rangoon
PURPOSE OF PROJECT	The Government desires assistance in establishing a Polymer Chemistry Research Laboratory at the Union of Burma Applied Research Institute (UBARI) to serve industries using plastics and synthetic fibres.
DUTIES	The expert will be a member of a team of three experts the other two being a polymer chemist (thermosetting resins) and a synthetic fibre technologist to be assigned to UBARI. He will be expected to carry out the following: (1) in consultation with appropriate authorities to draw up a programme of research on the polymerization of vinyl unsaturated monomers such as athylene, propylene, vinyl chloride and styrane; (2) to make recommendations for laboratory buildings, space, utilities requirements and polymerization apparatus to study reaction kinctios as well as to characterize the polymers obtained; (3) to design a training programme for local personnel; (4) to assist in drawing up a draft Special Fund Project as phase II;
QUALIFICATIONS	University degree preferably with Ph.D. in polymer chemistry with extensive experience in vinyl polymerization and characterization of polymers.
LANGUAGE	English
BACKGROUND INFORMATION	UBARI established by the Government in 1954 is responsible for carrying out industrial research under the Ministry of National Planning. Present research activities include metallury, ceramics, food, pharmaceuticals, cellulose, applied chemistry, physics and

engineering. These fields are backed by supporting services such as analytical, instrumentation, standards and information. With abundant natural resources (natural gas and wood) as well as basic petrochemical production being planned in the near future, the Government plans to establish a polymer research laboratory at UBARI to conduct a programme of work in plastics and synthetic fibres, the domestic demand for which is increasing rapidly. The laboratory will be built shortly. In the course of the next five years, the laboratory intends to train local scientists and engineers in polymer science, and plastics and synthetic fibres technology, to conduct technical services to industry and to lay sufficient groundwork so that research projects compatible with local conditions are started.

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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

6 February 1971

Request from the Government of Burma
for Special Industrial Services

DRAFT JOB DESCRIPTION

POST TITLE	Synthetic Fibre Technologist
DURATION	Three weeks
DATE REQUIRED	As soon as possible
DUTY STATION	Rangoon
PURPOSE OF PROJECT	The Government desires assistance in establishing a Polymer Chemistry Research Laboratory at the Union of Burma Applied Research Institute (UBARI) to service industries using plastics and synthetic fibres.
DUTIES	The expert will be a member of a team of three experts, the other two being a polymer chemist (thermoplastics) and a polymer chemist (thermosetting resins) to be assigned to UBARI. He will be expected to carry out the following: (1) in consultation with appropriate authorities, to formulate a programme of research on the synthesis of petrochemical intermediates and polymers such as polyesters, nylons and other synthetic fibres, including those based on urea as well as on fibre processing techniques; (2) to advise on the laboratory buildings, space, utilities and equipment including pilot-scale equipment required for both synthesis and evaluation of fibres; (3) to design a programme of training for local personnel; (4) to assist in drawing up a draft Special Fund Project as Phase II.
QUALIFICATIONS	University degree, preferably with Ph.D. in polymer science or synthetic fibre technology with exgensive experience in the synthetic fibre industry.
LANGUAGE	English
BACKGROUND INFORMATION	UBARI established by the Government in 1954, is responsible for carrying out industrial research under the Ministry of National Planning. Present research activities include metallurgy, ceramics, food,

pharmaceuticals, cellulose, applied chemistry physics and engineering. These fields are backed by supporting services such as analytical, instrumentation, standards and information. With abundant natural resources (natural gas and wood) as well as basic petrochemical production being planned in the near future, the Government plans to establish a polymer research laboratory at UBARI to conduct a programme of work in plastics and synthetic fibres, the domestic demand for which is increasing rapidly. The laboratory will be built shortly. In the course of the next five years, the laboratory intends to train local scientists and engineers in polymer science and plastics and synthetic fibre technology, to conduct technical services to industry and to lay sufficient groundwork so that research projects compatible with local conditions are started.

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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
REQUEST FROM THE GOVERNMENT OF BURMA FOR SPECIAL INDUSTRIAL SERVICES

POST TITLE: WOOD PRESERVATIVES & PESTICIDES EXPERT

DURATION: Four weeks

DATE REQUIRED: MAY/JUNE 1971

DUTY STATION: RANGOON

PURPOSE OF PROJECT: The Government desires assistance in assessing the possibilities of production of naphthenic acides from refinery product streams, determine future demands for wood preservatives and pesticides in the country.

DUTIES: The expert will assist the Syriam Oil Refinery and the Industrial Development Corporation (IDC) and is expected to carry out the following:

1. In consultation with appropriate authorities establish future demands for wood preservatives and pesticides in the country.

2. Assist in establishing percentages of naphthenic acid in refinery product streams and make extraction experiments and evaluate economic feasibilities of production;

3. Study the feasibility of production of naphthenic acid from tobacco waste and work out a project IDC);

4. Re-assess possibilities of establishing pesticides formulation plants (IDC);

5. Study uses of excess chlorine (IDC).

6. Assist in drawing up further assistance in the field of pesticides.

QUALIFICATIONS: Master of Science or Doctor of Science degree in Chemistry or Chemical Engineering with experience in Research, Development and Production of wood preservatives and pesticides.

LANGUAGE: ENGLISH

BACKGROUND INFORMATION

The system of railways under the Tyarma Oil Corporation (TOC) is now importing about 2[illegible] pairs of railway sleepers for the use by the Railway Board. These sleepers are for preventing termite attack and fungus growth. Treatment of the sleepers and also the power posts and timber [illegible] is expected to be of great benefit to the country. It is envisaged to substitute these with their wood preservatives such as copper naphthenate and penta-chloro phenol [illegible] naphthenate and [illegible], hence recovered from refinery process streams.

[illegible] benefit will result if [illegible] waste which [illegible] to the extent of [illegible] tons per [illegible] as fuel oils and pesticides. Setting [illegible] plant will benefit the country by [illegible] its foreign exchange [illegible]. Railways are required to take [illegible] against the government's policy to [illegible] about the [illegible]

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Annex VI - B

Rangoon, 8 March 1971

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
REQUEST FROM THE GOVERNMENT OF BURMA FOR SPECIAL INDUSTRIAL SERVICES

POST TITLE:	PETROCHEMICAL AND OIL REFINERY PLANNING EXPERT
DURATION:	SIX MONTHS
DATE REQUIRED:	AS SOON AS POSSIBLE
DUTY STATION:	The Government desires to follow up the assistance already completed by an expert provided by the UN Natural Resources and Transport Division and the assistance provided by UNIDO for training purposes. Assistance is needed in planning for the development of petrochemical industry and training personnel.
DUTIES:	The expert will assist the Myanma Oil Corporation (MOC) and the Syriam Oil Refinery in carrying out the following: 1. Evaluate market and study the possibilities of producing polyethylene and poly-vinyl chloride using naphtha as raw material; 2. Assist in deciding expansion of port facilities or other transport facilities for exporting naphtha; 3. Assist in following up efforts to put up a new one-million ton refinery, install plant for production of narrow boiling range fractions and lubricating oil blending plant; 4. Evaluate possibilities of producing liquified natural gas (L.N.G.) 5. Assist in setting up a training centre for operation and maintenance personnel.
QUALIFICATIONS:	University degree in Chemical Engineering with extensive experience in petrochemical and refinery production, planning and execution.
BACKGROUND INFORMATION:	The Myanma Oil Corporation (MOC) is studying the possibilities of setting up an ethylene cracker using naphtha. Plans are well advanced for increasing refinery capacity by one million tons per year. The consumption of kerosene and diesel oil are expected to grow at the rate of 7-8 per cent per year. Present production of fuel oil is

not sufficient to meet demand and hence imports are necessary. Production l-p-G and L.N.G. are also envisaged. The Government is anxious for the estal lishment of plants for producing fractions with narrow boiling range and for blending lubrication oil.

A training centre is being developed and the building is under construction. The Universal Process Trainer and the Universal Laboratory Pilot Plant being supplied under UNIDO assistance will be used for this purpose.

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Annex VI C

Data on analyses of different Refinery Products

for Naphthenic Acids

CRUDE

Type	Intermediate base
Sulphur content	0.2 wt.
H_2S content	Nil
Acidity, Inorganic mgms KOH/gm	Nil
Acidity, Organic " "	0.05

LOTOR GASOLINE FRACTION (C_5 to 150° C)

Sulphur content % wt.	0.01
Acidity, Inorganic mgms KOH/gm	Nil
" Organic " "	0.01
Cetane Rating (F-2) Scale	60 to 65

KEROSINE (150 to 250° C)

Sulphur content % wt.	0.05
Acidity, Inorganic mgm KOH/gm	Nil
" Organic " "	0.05
Smoke point mms.	18 to 20
Aromatics % vol. FIA	20 to 22

DIESEL (250 to 350° C)

Sulphur content % wt.	0.2 maximum
Acidity, Inorganic mgm KOH/gm	Nil
" Organic " "	0.6 to 1.0
Diesel Index	48

90 million gallons per year

Characteristics of Pressure Distillate Bottoms:-

Sp. Gr. at 60/60°F	0.8790
IBI/FBP°C	205/345
10% Vol. recovery °C	225
20% "	230
30% "	236
40% "	244
50% "	253
60 "	263

70% Vol. recovery °C	275	
80% "	286	
90% "	303	
95% "	318	
% Vol. recovered at 225°C	10	
" 250 "	46	
" 275 "	76	
" 300 "	88	
" 325 "	97	
Sulphur content % W/W	0.14	
Phenolic compd. content % V/V	2.0	13 million gallons per year
Matter insoluble in toluole % wt.	0.01	
Water content % Vol.	Nil	

Routes to Wood Preservative

(1) Naphthenic Acids

Content in Gas Oil 280 - 350° C	0.6 to 1.0 mg/KOHgr Organic Acidity
Raw Feed available annually	- 50 Million I.G.
Quality of Diesel after above extraction	- Still passes marketing specification

(2) Cresol/Phenolic Compounds

Presence in Pressure Distillate Bottom	- 2% W/V
Raw Feed availability annually	- 13 Million I.G.
Quality of Product after extraction	- Still passes marketing specification

(3) Present Imports of Creosote

Use now only for Railways at 200,000 I. G. per year - but actual consumption about double this figure - last imported cost FOB £ 1.57 per I.G.

(4) Penta Chloro Phenol

Annex VII

Fertilizer Import and Utilization

Appendix - 13
(In Thousand Kyats)

Sr. No.	Description	1961 - 62		1962 - 63		1963 - 64		1964 - 65	
		Ton	Value	Ton	Value	Ton	Value	Ton	Value
1	2	3	4	5	6	7	8	9	10
1	Imports								
1	Urea					205	110	2560	1866
2	Super Phosphate			80	24	5	3	2620	1249
3	Murate of Potash			250	123	312	154	200	99
4	Compost (M)			2200	655				
5	Compost (B)								
6	Sangral								
7	Cornrose Fertilizer								
8	Nitro Phoska								
9	Potassium Sulphate								
10	Ammonium Sulphate	14815	3812	17300	3868	19425	3496	4000	1372
11	Bone Meal (Local)	1 50	592					2178	632
12	Ammonium Phosphate	9900	4047	16300	5709	12000	3110	32000	15456
13	Others	630	250	40	12			11	3
	Total	27095	8701	36170	10481	31947	6873	43569	20677
2	Utilization								
1	Urea					205	123	497	383
2	Super Phosphate			80	47	5	3	197	106
3	Murate of Potash			250	95	312	119	200	96
4	Compost (M)								
5	Compost (B)								
6	Sangral								
7	Cornrose Fertilizer								
8	Nitro Phoska								
9	Potassium Sulphate								
10	Ammonium Sulphate	14815	3704	10835	3467	13631	3967	16586	6087
11	Bone Meal (Local)	1550	403	1315	421	348	112	1445	455
12	Ammonium Phosphate	9900	2970	7514	2780	14413	6832	10128	5216
13	Others							11	3
	Total	26256	7077	19994	6810	28914	11156	29064	12346

Annex VII

Fertilizer Import andUtilization

Appendix - 13 (Cont'd)
(In Thousand Kyats)

(28)

Sr. No.	Description	1965 - 66		1966 - 67		1967 - 68		1968 - 69	
		Ton	Value	Ton	Value	Ton	Value	Ton	Value
1	2	11	12	13	14	15	16	17	18
1	Imports								
1	Urea	7500	4920	11000	4684	120854	46 47	12500	4962
2	Super Phosphate	1500	633	10000	4097	78654	33277	18300	6991
3	Murate of Phosphate			200	62	28079	6694		
4	Compost (M)			200	86	900	257	700	266
5	Compost (B)			700	215	400	105	1300	451
6	Sangral							*	
7	Cornrose Fertilizer								
8	Nitro Phoska					30	12		
9	Potassium Sulphate					80	31		
10	Ammonium Sulphate	15000	5033			250	56		
11	Bone Meal (Local)	2500	722	2100	624	3000	870	2000	578
12	Ammonium Phosphate								
13	Others	5	2			49	44		
	Total	26505	11316	24400	9748	232522	87384	34800	13246
2	Utilization								
1	Urea	211	127	743	4443	30920	18550	24699	14819
2	Super Phosphate	139	73	1559	994	24363	13131	10672	5714
3	Murate of Potash			200	120	5801	2785	1158	556
4	Compost (M)			200	86	434	166	297	106
5	Compost (B)			700	215	331	105	1000	316
6	Sangral							*	
7	Cornrose Fertilizer								
8	Nitro Phoska								
9	Potassium Sulphate					50	22	20	9
10	Ammonium Sulphate	1710	345	4800	3803	516	197	159	59
11	Bone Meal (Local)	1445	442	2100	668	2224	689	1321	410
12	Ammonium Phosphate	11950	3814	8000	4128	4803	2468	2190	1121
13	Others	5							
	Total	30949	13144	25599	14457	70042	38103	41 8	23017

* 1000 Fluid Gallon.

Annex VII

Fertilizer Import and Utilization

Appendix-13 (Cont'd)
(In Thousand Kyats)

Sr. No.	Description	1969 - 70	
		Ton	Value
1	2	19	20
1	**Imports**		
1	Urea	8251	3165
2	Super Phosphate		
3	Murate of Phosphate		
4	Compost (M)		
5	Compost (B)	1200	431
6	Sangral	1000	11
7	Cornrose Fertilizer	35	23
8	Nitro Phoska	645	351
9	Potassium Sulphate	20	12
10	Ammonium Sulphate	1400	267
11	Bone Meal (Local)	1400	300
12	Ammonium Phosphate	1600	560
13	Others		
	Total	14551	5120
2	**Utilization**		
1	Urea	56400	31020
2	Super Phosphate	25000	11575
3	Murate of Potash	4300	1191
4	Compost(M)		
5	Compost (B)	1200	483
6	Sangral	1000	11
7	Cornrose Fertilizer	35	28
8	Nitro Phoska	645	354
9	Potassium Sulphate	20	13
10	Ammonium Sulphate	1000	242
11	Bone Meal (Local)	2562	794
12	Ammonium Phosphate	2400	869
13	Others		
	Total	93562	46580

* 1000 Fluid Gallon.

SECTION 1

Annex VIII

Utilization of Insecticides

(Value in Kyats)

Sr. No.	Description	Unit	1961 - 62		1962 - 63		1963 - 64		1964 -
			Quantity	Value	Quantity	Value	Quantity	Value	Quantity
1	2	3	4	5	6	7	8	9	10
1	Insecticides								
1	Lindane (Powder)	lbs.	62720	136730	344420	750836	611499	1333068	659859
2	Lindane (Liquid)	Gals.	1021	21084	2409	49746	6987	144282	1392
3	Gammazin(Powder)	lbs.	64940	262358	336044	1357618	30695	124008	4629
4	Gammazin(Liquid)	Gals.	40	1322	9751	322271	53	1752	
5.	Endrine (Liquid)	Gals.	149	4697	6082	191705	2324	73253	2446
6.	D.D.T. (Powder)	lbs.	7219	8952	36879	45730	23277	28864	5179
7.	D.D.T. (Liquid)	Gals.	68	530	578	4503	634	4939	2306
8	Aldrin (Powder)	lbs.	14560	5096	2771	970	15241	5334	15005
9	Aldrin (Liquid)	Gals.			691	5583	758	6125	2194
10	Zinc Phosphate (Powder)	lbs.	1035	3457	969	3236	349	4506	5247
11	Cymag	lbs.	1616	3119	303	585	667	1287	1192
12	Malathion(Liquid)	Gals.			1020	37352	19	696	4830
13	Dioldrin(Liquid)	Gals.	1140	33972	476	14185	613	18267	1303
14	Sulphinate (Liquid)	Gals.	80	302	313	1534	13	64	12
15.	Copper Sulphate	lbs.	112	140	2	3	93	116	40
16	Aretan	lbs.	455	3049			59	335	
17	Perenox	lbs.			964	3374	325	1138	24
18	Zebenides	lbs.					26	74	
19	Ovioide (Liquid)	Gals.					5	23	
20	Amboilium	Gals.					5	52	1
21	Agrosan G.N.	lbs.	713	1312	67	123			
22	Sulphur (Powder)	lbs.			3420	992			
23	Verdesan	lbs.							
24	Fernitte	Gals.							
	Total	Lbs.	153370)	486210	725839	2700346	683222)	1748183	691175)
		Gals.	2498)		21320		11411)		14484)

Annex VIII

Utilization of Insecticides

(Value in Kyats)

tion	Unit	1961 - 62		1962 - 63		1963 - 64		1964 - 65	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	3	4	5	6	7	8	9	10	11
cides									
ne (Powder)	lbs.	62720	136730	344420	750836	611499	1333068	659859	1438493
ne (Liquid)	Gals.	1021	21084	2409	49746	6987	144282	1392	28745
zin(Powder)	lbs.	64940	262358	336044	1357618	30695	124008	4629	18701
zin(Liquid)	Gals.	40	1322	9751	322271	53	1752		
ne (Liquid)	Gals.	149	4697	6082	191705	2324	73253	2446	77098
. (Powder)	lbs.	7219	8952	36879	45730	23277	28864	5179	6422
. (Liquid)	Gals.	68	530	578	4503	634	4939	2306	17964
n (Powder)	lbs.	14560	5096	2771	970	15241	5334	15005	5252
n (Liquid)	Gals.			691	5583	758	6125	2194	17728
Phosphate									
(Powder)	lbs.	1035	3457	969	3236	349	4506	5247	17525
	lbs.	1616	3119	303	585	667	1287	1192	2300
hion(Liquid)	Gals.			1020	37352	19	696	4830	176875
rin(Liquid)	Gals.	1140	33972	476	14185	613	18267	1303	38929
inate									
(Liquid)	Gals.	80	392	313	1534	13	64	12	59
r Sulphate	lbs.	112	140	2	3	93	116	40	50
n	lbs.	455	3049			50	335		
ox	lbs.			964	3374	325	1138	24	84
ides	lbs.					26	74		
de (Liquid)	Gals.					5	23		
lium	Gals.					5	52	1	10
an G.N.	lbs.	713	1312	67	123				
ur (Powder)	lbs.			3420	992				
san	lbs.								
tte	Gals.								
Total	Lbs.	153370)	486210	725839	2700346	683222)	1748183	691175)	1846135
	Gals.	2498)		21320		11411)		14484)	

SECTION 2

Annex VIII

Utilization of Insecticides

(Value in Kyat)

Sr. No.	Description	Unit	1965 - 66		1966 -67		1967 - 68		19
			Quantity	Value	Quantity	Value	Quantity	Value	Quantity
(1)	(2)	(3)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1	Insecticides								
1	Lindane (Powder)	lbs.	224345	489072	356729	777669	352207	230704	350740
2	Lindane (Liquid)	G ls	204	4213	1116	23045	531	10965	320
3	Gammazin(Powder)	lbs.	8172	33015	2943	11890	660	173	4060
4	Gammazin(Liquid)	Gals.			5	165	6235	19578	
5	Endrine (Liquid)	Gals.	7862	247810	19420	612118	63753	200822	5305
6	D.D.T. (Powder)	lbs.	28575	35433	16916	20976	21801	26914	25783
7	D.D.T. (Liquid)	Gals.	2406	18743	303	2360	300741	2015107	3564
8	Aldria (Powder	lbs.	31274	10946	506	177	85095	30191	119579
9	Aldrin (Liquid)	Gals.	504	4072	208	1681	266	2149	24823
10	Zinc Phosphate (Powder)	lbs.	2523	8427	5007	16723	1591	5317	1531
11	Cymag	lbs.	952	1837	1343	2592	571	1102	879
12	Malathion(Liquid)	Gals.	1629	59654	4947	181159	13715	422870	1924
13	Dieldrin(Liquid)	Gals.	1742	51912	210	6258	5	149	98
14	Sulfinitte	Gals.	85	417	62	304	47	235	372
15	Copper Sulphate	lbs.	100	125	11024	13780	10	12	307
16	Aretan	lbs.	20	134	633	4241	4208	23927	586
17	Perenox	lbs.	556	1946	2991	10469	3079	10776	1899
18	Zebenides	lbs.	14	40					
19	Ovicide (Liquid)	Gals.							
20	Ambolium	Gals.			2	21	26	273	2
21	Agrosan G.N.	lbs.	38	70	113	208	276	508	1378
22	Sulphur	lbs.							12
23	Verdesan	lbs.			7	20			10
24	Fernitte	Gals			48	203			37
	Total	Lbs.	296569)	967866	398212)	1686067	469577)	30[illegible]772	506764)
		Gals.	14432)		26321)		385319)		36437)

SECTION 1

Annex VIII cont'd

Utilization of Insecticides

(Value in Kyat)

tion	Unit	1965 - 66		1966 -67		1967 - 68		1968 - 69	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	(3)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
cides									
ne (Powder)	lbs.	224345	489072	356729	777669	352207	230704	350740	764613
ne (Liquid)	G ls	204	4213	1116	23045	531	10965	320	6443
zin(Powder)	lbs.	8172	33015	2943	11890	660	173	4060	16402
zin(Liquid)	Gals.			5	165	6235	19578		
ne (Liquid)	Gals.	7862	247810	19420	612118	63753	200822	5305	167214
. (Powder)	lbs.	28575	35433	16916	20976	21801	26914	25783	31971
. (Liquid)	Gals.	2406	18743	303	2360	300741	2015107	3564	27764
a (Powder	lbs.	31274	10946	506	177	85095	30191	119579	41853
n (Liquid)	Gals.	504	4072	208	1681	266	2149	24823	200570
Phosphate									
(Powder)	lbs.	2523	8427	5007	16723	1591	5317	1531	5114
	lbs.	952	1837	1343	2592	571	1102	879	1697
hion(Liquid)	Gals.	1629	59654	4947	181159	13715	422870	1924	70457
rin(Liquid)	Gals.	1742	51912	210	6258	5	149	98	2920
nitte	Gals.	85	417	62	304	47	235	372	1823
r Sulphate	lbs.	100	125	11024	13780	10	12	307	384
n	lbs.	20	134	633	4241	4208	23927	586	3926
ox	lbs.	556	1946	2991	10469	3079	10776	1899	6647
ides	lbs.	14	40						
de (Liquid)	Gals.								
ium	Gals.			2	21	26	273	2	21
an G.N.	lbs.	38	70	113	208	276	508	1378	2536
ur	lbs.							12	4
san	lbs.			7	20			10	39
tte	Gals			48	203			37	157
Total	Lbs.	296569)	967866	398212)	1686067	469577)	30[illegible]772	506764)	1352555
	Gals.	14432)		26321)		385319)		36437)	

SECTION 2

Annex VIII cont'd

Utilization of Insecticides

(Value in Kyats)

. .	Description	Unit	1969 - 70	
			Quantity	Value
)	(2)	(3)	(20)	(21)
	Insecticides			
1	Lindane (Powder)	lbs.	183060	457650
2	Lindane (Liquid)	Gals.	83021	1838284
3	Gammazin(Powder)	lbs.	41754	154430
4	Gammazin(Liquid)	Gals.	169	14727
5	Endrine (Liquid)	Gals.	67683	2108325
6	D.D.T. (Powder)	lbs.	220400	264072
7	D.D.T. (Liquid)	Gals.	67500	506250
8	Aldrin (Powder)	lbs.	423[illegible]47	286393
9	Aldrin (Liquid)	Gals.	355	2875
10	Zinc Phosphate (Powder)	lbs.	4088	11308
11	Cymag	lbs.	7147	14734
12	Malathion(Liquid)	Gals.	20324	894382
13	Dieldrin(Liquid)	Gals.	152	4560
14	Sulfinitte	Gals.	13	78
15	Copper Sulphate	lbs.	64416	80520
16	Aretan	lbs.	103225	691607
17	Perenox	lbs.	95281	333484
18	Zebenides	lbs.		
19	Ovicide (Liquid)	Gals.		
20	Amboliun	Gals.		
21	Agrosan G.N.	lbs.	75297	138528
22	Sulphur	lbs.	265243	76920
23	Verdesan	lbs.	588	2317
24	Fernitte	Gals.		
	Total	lbs.	1984336)	7879535
		Gals.	2545.7)	

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNITED NATIONS DEVELOPMENT PROGRAMME

Request from the Government of Burma

Job Description

POST TITLE	Expert for an Exploratory Mission on Maintenance and Repair - Mechanical Engineer
DURATION	2 months
DATE REQUIRED	As soon as possible
DUTY STATION	Rangoon
PURPOSE OF PROJECT	Assistance in an exploratory and advisory mission on the upgrading and improvement of the maintenance and repair facilities in the country.
DUTIES	The expert will work in close co-operation with Government Institutions and is expected to: - collect the available information and statistical data concerning the import of industry equipment and spare parts; - evaluate the adequacy of the existing maintenance and repair schemes in different enterprises, - examine the possibilities of upgrading and improving the existing maintenance and repair facilities and services; - determine the needs for new machinery to be used for efficient maintenance and repair activities, - identify the industrial and economic opportunities for profitable manufacture of certain spare parts, - identify the possibility of setting up a pilot workshop for repair and maintenance and spare parts production; - formulate the short- and long-term programme in this field.
QUALIFICATIONS	Degree or equivalent in mechanical engineering with extensive experience in the field of maintenance and repair and feasibility studies.
LANGUAGE	English

BACKGROUND INFORMATION

[illegible] Bureau's assistance in the field [illegible] of industrial equipment [illegible] its manufacture.

[illegible] feasibility service is expected to be [illegible] the feasibility study [illegible] to be implemented. In this [illegible] assistance will be rendered by UNIDO staff [illegible] the last two weeks in order to assist the Bureau in preparing the request for further technical assistance in this field.

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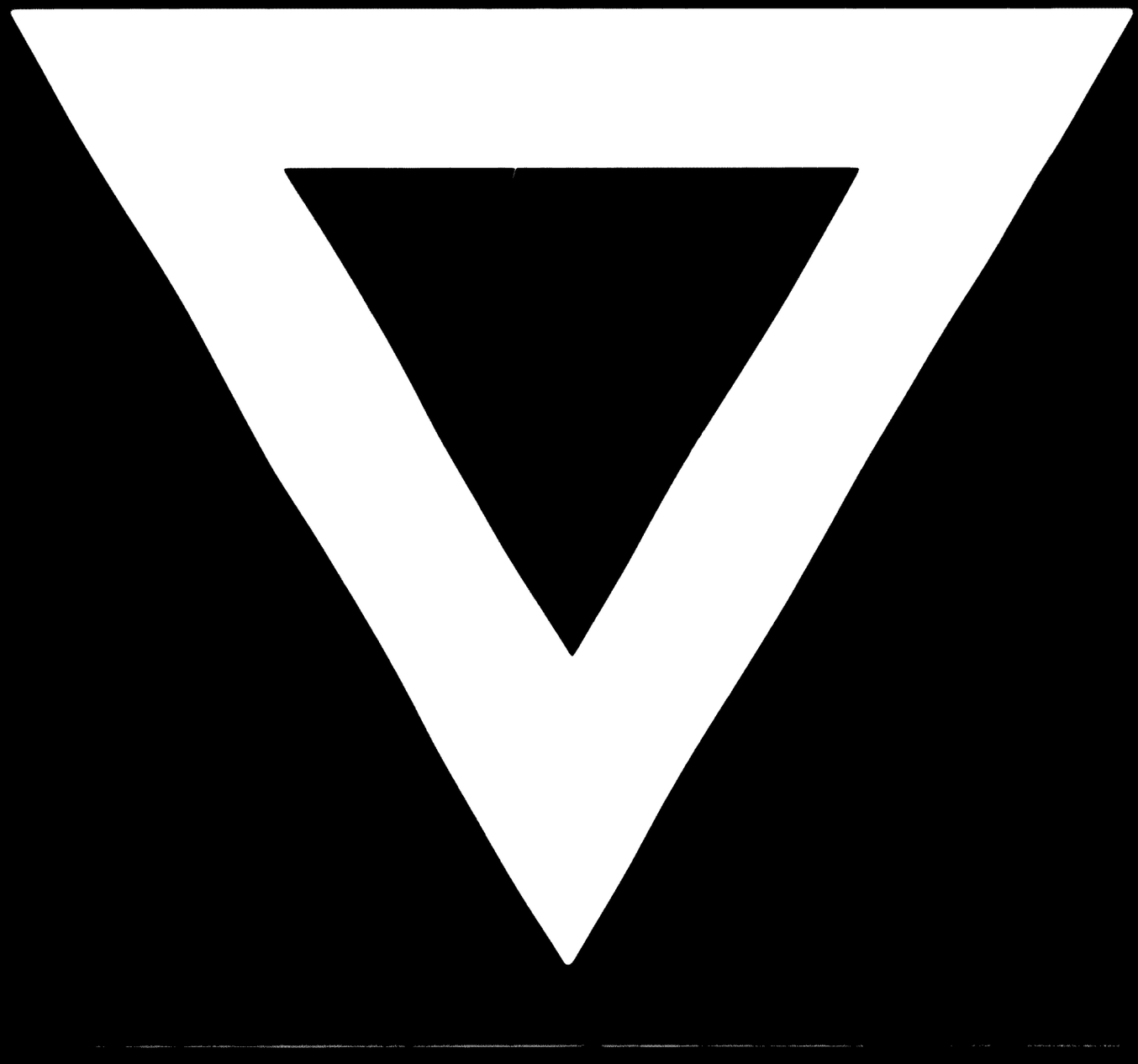
C-794



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