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**STRENGTHENING OF THE CHINA DYEING
AND FINISHING DEVELOPMENT CENTRE**

DG/CPR/87/017/11-01A

CHINA

Technical report: Second visit of the Chief Technical Adviser*

Prepared for the Government of the People's Republic of China
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

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* This document has not been edited.

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ABBREVIATIONS

CDFDC	China Dyeing and Finishing Development Centre
Co/PE	Cotton/Polyester blend
CTA	Chief Technical Adviser
ID	Information Department
IIC	International Institute for Cotton
NPD	National Project Director
PE	Polyester
PE/Co	Polyester/Cotton blend
PP	Pilot Plant
PPER	Project Performance Evaluation Report
PRC	People's Republic of China
R & D	Research and Development
SI	Shirley Institute, Manchester (UK)
RDD	Research & Development Department
SRRL	Southern Regional Research Laboratory (USA)
STIB	Shanghai Textile Industry Bureau
STRi	Shanghai Textile Research Institute
TD	Training Department
TPRM	Tripartite Review Meeting
UNDP	United Nations Development Programme
WTA	World Textile Abstract

I. SUMMARY

The object of the second mission (22nd November 1988 to 22nd December 1988) was to monitor progress of the FOUR 'Immediate Objectives', as detailed in the Project document "Strengthening of the China Dyeing & Finishing Development Centre", for the year ending December 1988.

Satisfactory to good progress was observed in three out of four outputs, viz. work and activities of the RDD, TD and ID. Only one objective, the setting-up of the PP was unsatisfactory, owing to procedural delays in acquiring land to build, and in getting planning permission to build. A lack of funds to proceed from the design and planning stage to the building stage has contributed to the delays incurred. Some progress, however, has been made recently and building work is now expected to start during December 1988.

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II. INTRODUCTION

The background to the formation of the CDFDC and the four 'Immediate Objectives' laid down for its efficient functioning have previously been described in the Technical Report:

**First Visit of the Chief Technical Adviser (ref. DP/ID/SER.A/975)
dated 25 February 1988.**

During that first visit, agreement was reached on the selection and appointment of six International Experts to be engaged by UNIDO to render advice and help to the various sections and departments within the CDFDC. Other activities such as: Fellowships, Training, Study Tours, Lecturers and Factory visits by the CTA were reported in extenso.

The purpose of the CTA's second mission has been threefold:

First, to monitor and assess the progress made in the year ending December 1988 in meeting the four 'Immediate Objectives', viz. i/ strengthening the RDD; ii/ establishing a PP; iii/ establishing a TD; iv/ establishing an ID.

Secondly, to agree with the NPD the completion of a Project Performance Evaluation Report (PPER), a necessary prerequisite for the holding of a Tripartite Review Meeting (TPRM).

Thirdly, to help the activities of the CDFDC by Discussions, Lectures and Factory Visits.

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III. RECOMMENDATIONS

As three of the 'Immediate Objectives' of the Project: "Strengthening the China Dyeing & Finishing Development Centre" are making satisfactory progress, it is essential that, if the Project as a whole is to succeed, delays to the fourth, i.e. setting up of a Pilot Plant (PP), are speedily overcome. Delays have occurred because of legal and procedural difficulties in purchasing land and obtaining planning permission and a lack of funds from central and local Government sources. It is therefore recommended that CDFDC management:

1. is given the 'green light' to proceed with erecting the PP buildings. A tender for putting up the plant and install services has been accepted.
2. is allowed to place orders during 1989 for selected Chinese and Foreign machinery and equipment (see Annexe IXc) for phased delivery to the newly erected PP as required.
3. can resume the Fellowship programme by sending two selected candidates to the UK (Courtaulds plc) and the U.S.A. (SRRL) respectively.
4. is given permission to arrange the postponed Study Tour to the U.S. and Canada in the 1st quarter of 1989.

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IV. PROJECT PERFORMANCE EVALUATION REPORT (PPER)

The completion of a modified PPER was agreed between the NPD and the CTA. This newly completed PPER has been made available to interested Chinese Government Agencies through the Ministry of Textiles (Dr. Zhu Xing), as well as to UNDP and UNIDO.

The amended PPER will form the basis for the postponed Tripartite Review Meeting (TPRM) now expected to take place in April 1989.

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V. REVIEW OF ACTIVITIES AND OUTPUT

V.A. Research and Development Department (RDD)

Several research and development (R & D) investigations have been completed in 1988 and the results published in reports, which have been widely circulated. These include the following:

- i/ Shortening (streamlining) preparation processes for cotton, which are based on combining the scouring and bleaching operation into a single process. This one year study was successfully completed with the help of the Preparation Expert, Mr. Kenneth Dickinson (Ref. 11-02). These improved processes have been successfully transferred to a mill in Kun Shan county, which is directly benefitting from this technology transfer.
- ii/ A 3-year study on flame retardant finishes for 100% cotton (Co), cotton/polyester (Co/PE) blends, viscose, 100% polyester (PE) has been completed. The results have been transferred to Shanghai No. 2 Dyeing and Printing Mill. By using the newly developed flame retardant products, the Mill has earned an additional RMB Yuan 700,000 in 1988.
- iii/ Work on antibacterial finishes for 100% Co and Co blends has been completed and reported.

The following R & D investigations are in progress:

- iv/ Rapid Dyeing of 100% Co with reactive dyes.
- v/ One bath disperse/reactive dyeing systems for PE/Co blends. It is anticipated that the Dyeing Expert, Dr. Wolfhard Beckmann (Ref. 11-07), will make a notable contribution to investigations iv/ and v/.
- vi/ Direct coating with acrylic coating agents. An examination of coating compositions, processes and equipment is in progress. This investigation is receiving financial support from the Shanghai Textile Industry Bureau (STIB) and the Ministry of Textiles, Beijing.

V.B. Pilot Plant (PP)

1. Buildings

A 12 months delay has been incurred in getting this 'Immediate Objective' off the ground. Delays occurred because of procedural difficulties in purchasing land in the Shanghai region. At the time of the CTA's first visit in January 1988, lengthy negotiations were still in progress and ownership of the site was not finalised until June 1988. A further three months elapsed before planning and building permissions were obtained. Tenders to erect the building (described in the CTA's First Technical Report, Section VIIC. PILOT PLANT) were sought in September 1988 and six tenders were received by a dead line in November 1988. One tender has now been accepted (cost approx. RMB Yuan 720,000) and the signing of the contract was fixed for week commencing 19th December 1988. Final site clearance, part-filling-in and laying of foundations were planned to commence in the latter part of December 1988 and completion is scheduled for December 1989.

The site purchased at Hunan Road, Nanwei County, Shaghai, comprises an area of 43 mu = 28,380sq.m. (Erratum in CTA's First Technical Report p.25; please amend). The CTA has visited the site and walked the perimeter, officially marked by cornerstones erected by the Shanghai Municipality. A 'blue-print' of the site and the proposed lay-out of buildings etc. is enclosed (see Annex IXC). A high-voltage transformer has already been installed for building purposes. It is hoped that a start was made with laying the foundations in December 1988. The site, on the East side of the Huang Pu river, is approx. 17km from the centre of Shanghai and approx. 12km from CDFDC offices at STRI.

2. Machinery and Equipment

The present list of machinery and equipment, both of Chinese and Foreign origin, must be very different from that included under Annex IIb in the PROJECT DOCUMENT. (N.B. The CTA has never seen Annex IIb! No copies could be found at CDFDC, UNDP, or UNIDO). On the occasion of the CTA's first visit to CDFDC in January 1988, the NPD explained that owing to a shortage of funds the continuous dyeing line for PE/Co blends had been shelved and the printing line had met with the same fate. During the CTA's second visit, the NPD said that owing to a lack of funds the continuous rope preparation line had also been cancelled. These economy measures may be essential, but the net results will be a drastic curtailment of the processing facilities available at the PP. The absence of a continuous dyeing line, with only batchwise dyeing facilities, will detract from the potential importance and value of the PP and may jeopardize the achievement of one of the 'Immediate Objectives' of the Project "Strengthening of the China Dyeing and Finishing Development Centre". A list of full width production scale Foreign and Chinese machinery to be acquired for the PP can be found in Annex IXE. Included in the same Annex is a list of Foreign Laboratory equipment requested and details of three Foreign machines already purchased.

V.C. Training Department (TD)

The 'Immediate Objectives' of the TD include the systematic training of mill technicians in current processing techniques and in demonstrating and applying techniques developed at CDFDC.

During the period under review, training has taken place in the premises of STRI and in local factories. In all, 15 training courses have been held. Of particular importance was a training course on fabric coating, with participants from all over the PRC. Other training courses included the following:

- i/ elimination of weft diagonal distortion;
- ii/ foam finishing;
- iii/ appraisal of current dyeing and finishing auxiliaries;
- iv/ maintenance of processing machinery used in preparation, dyeing, printing and finishing.

Some 450 people attended the above 15 training courses. The information provided will help mill personnel at all levels:

- i/ to obtain a better appreciation of their tasks
- ii/ to function more effectively and efficiently at their place of work.

D. Information Department (ID)

The 'Immediate Objectives' of the ID include the collection and distribution of technical information and documentation on preparation, dyeing, printing and finishing. A survey and guide of commercial acceptance standards of fabric qualities is also mentioned.

During the period under review, the output of the ID includes the following:

- i/ Progress is being made with storing information on a computer of all foreign preparation, dyeing, printing and finishing machinery in the PRC; this information is available to the wet processing industry of the PRC.

- ii/ Two monthly publications are widely circulated to the industry as appropriate, viz;
 - (a) "Dyeing and Finishing" (in collaboration with STRI) reports the results of dyeing and finishing investigations carried out at STRI and CDFDC.
 - (b) "Dyeing and Finishing Information" provides news and views about the industry

Information on availability and description of dyes, chemicals and auxiliaries in use in the PRC is being collected and stored in the computer. Lists of articles published worldwide on Dyeing, Printing and Finishing will also be collected providing data retrieval support services to the staff of CDFDC, STRI and industry.

VI. REVIEW OF OTHER ACTIVITIES

A. Revised Schedule for International Experts

Project No. DG/CPR/87/017

<u>Post/Title</u>	<u>Ref.</u>	<u>Duration</u>	<u>Date Required</u>
Chief Technical Adviser	11-01	i) 0.7 m/m	17 Jan 1988-6 Feb 88 (Mission Completed)
		ii) 1m/m	22 Nov 88-22 Dec 88 (Mission Completed)
		iii) 1m/m	Oct - Nov 1989
		iv) 1m/m	Oct - Nov 1990
Experts in:			
Prep. of cotton & cotton blends	11-02	1m/m	June 1988 (Mission Completed)
Tech. Information Systems	11-04	1m/m	May-June 1989
Textile Dyeing	11-07	1m/m	May-June 1989 or 90
Text. Finishing & Fabric Coating	11-06	1m/m	August 1989
Textile Printing	11-03	1m/m	May-June 1989 or 90
Product Development of Textiles	11-05	1m/m	April-May 1990

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Comments

11-02 Preparation Expert. Mr. Kenneth Dickinson's mission was highly successful. He won general acclaim for the way he helped and encouraged members of the RDD in their studies of combined scouring and bleaching processes. His advice to processing mills was always valuable and his excellent public lectures drew large audiences. The NPD and his staff have expressed complete satisfaction with his visit and have formed a very high opinion of this expert's capabilities. An excellent Technical Report: 'Visit of expert in cotton and polyester/cotton preparation' dated June 1988 (Ref. DG/CPR/87/11-02/31.7B) is available.

11-04 Technical Information Systems Expert. Mr. Brian Rostron has been selected by UNIDO and his candidature has been approved by the NPD. This expert has an extensive knowledge of dyeing and finishing and is also well acquainted with microelectronics and computers. The tasks ahead for this expert, as defined by the NPD, comprise:

1. The introduction of new or modified software for the compilation of a register of all imported preparation, dyeing, printing machinery. This is an on-going survey (c.f. Section V.D p9) which requires extending.
2. The setting up of a database for articles and information published in China and Worldwide thereby providing data retrieval support services to CDFDC, STRI and the dyeing and finishing industry of the PRC.
3. The training of personnel in programming for the data base as described in 2 above.

Additionally, Mr. Rostron will be asked to prepare the following two lectures:

4. A Review of Existing Information Systems, e.g. Titus, WTA, including the use of data retrieval methods when carrying out a search in WTA.
5. Which information systems are best suited for retrieving articles on dyeing, printing and finishing.

11-07 Textile Dyeing Expert. Dr. Wolfhard Beckman is the preferred candidate and Bayer AG have agreed to his release. At Dr. Beckmann's recommendation, Bayer may consider sending two additional experts to CDFDC at their own expense. They are: Dr. Fredgar Hoffmann (Expert in computer-controlled dyeing methods) and Dr. Andreas Brocks or Dr. Stocka (Experts in colour measurement and instrumental colour matching).

As the PP will not, for the time being, contain a printing line, the NPD opined that it would be preferable for the Textile Printing expert to visit the CDFDC in May/June this year and for the Textile Dyeing expert's visit to be postponed by 12 months to May/June 1990 when full-scale and laboratory-scale dyeing machines are expected to be installed in the PP. Whilst Dr. Beckmann is agreeable to this suggestion, the Textile Printing expert is not and insists that his visit should take place in 1990 as originally planned. This slight contretemps is at present being resolved between UNIDO, the NPD and the experts involved.

Dr. Beckmann will be asked to give the following lectures during his visit to CDFDC.

1. Main trends and future developments in pigment dyeing of PE/Co blends, including details of machinery, processing techniques and recipes.
2. One-bath continuous dyeing of PE/Co blends with disperse/reactive dyes.
3. New batchwise and continuous dyeing processes for 100% cellulose, i.e. cotton, viscose, ramie and linen.
4. Rapid dyeing methods using jet and overflow machines for 100% PE fabrics with water and energy conservation in mind.
5. New trends in dyeing 100% Co and PE/Co blends: processes, mechanisms, auxiliaries.

11-06 Textile Finishing and Fabric Coating Expert. Ir. Jan Jongbloet is the preferred candidate and his visit is now scheduled for August 1989, when his own company, Vetex NV, is closed for their annual holidays. During his visit to CDFDC, Mr. Jongbloet will be asked to give the following five lectures:

1. New trends in finishing of Co, PE, silk and acrylic woven and knitted fabrics.
2. Flame retardant finishes for Co, PE, and Co/PE fabrics.
3. Special coating techniques, with particular reference to transfer coating and laminating, for Co, PE and other synthetic fibre fabrics.
4. Water repellent-, hydrophilic-, water vapour permeable-finishes for Co and PE/Co blend fabrics.
5. Hygienic finishes on polyamide, Co, PE and polyurethane fibre fabrics.

11-03 Textile Printing Expert. As the date of the visit of the selected candidate, Dr. L.W.C. Miles, is uncertain at present, the NPD decided to await developments before deciding on a lecture programme. However, the following lecture will definitely be required:

- The technical and commercial advantages and disadvantages of copper roller printing vs flat and rotary screen printing.

11-05 Product Development of Textiles. The name of the selected candidate, Mr. John Gordon, has not yet been put forward by UNIDO to the NPD. UNIDO also requires an undertaking from the SI that the expert will complete his report within three months.

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VI.B. Fellowships

During 1988 two fellows studied abroad each for a period of six months.

Mr. CAI Zhong Fang, a vice-director of CDFDC, was sent to the Shirley Institute (SI), Manchester, UK, and worked with Dr. J.R. Holker on various aspects of fabric coating. It also proved possible to arrange for him a short period of study at Centexbel, The Belgian Textile Research Institute at Gent, and a period of industrial training in the coating factories of N.V. Vetex at Kortrijk, Belgium, through the co-operation of the managing director, Ir. Jan Jongbloet. Mr. Cai has expressed his gratitude and indebtedness to the above mentioned for the opportunities he was afforded to learn a technology new to him. He expressed his thanks to all concerned at a lecture on transfer coating given to an audience of some 240 technologists on the 7th December, 1988. Mr. Cai is now heading a team on transfer coating in CDFDC. The Shanghai Municipality Government has agreed to support a 2-3 year R & D project at CDFDC at a cost of 3 million RMB Yuan. It is envisaged to install a full scale transfer coating line in the PP.

Mr. QUI Rong, an engineer at CDFDC, studied under the direction of Professor Russbach at Hamburg University, FRG. He investigated many aspects of coating with PTFE and intends to continue the research work at STRI.

Two further fellowships should have been taken up in 1988; these have had to be postponed until April 1989. It is now envisaged to send:

1. Mr. SHI Hui Ming to Courtaulds plc, where he will work with a R & D group in Spondon, Derby, UK, part of Courtaulds Research Division.
2. Miss HAO Ping to Southern Regional Research Laboratories (SRRL) in the USA.

The duration of both Fellowships is for six months.

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VI.C. Study Tours

The planned visit by CDFDC personnel to the American Textile Machinery Exhibition - International (ATME-I) held in Greenville, S.C., in October 1988 did not take place. Likewise, visits planned with the CTA's assistance to US and Canadian dyeing, printing and finishing companies, as well as to US machinery manufacturers, had to be cancelled.

As CDFDC personnel would benefit from a visit to US and Canadian textile wet processing mills and US machinery manufacturers, the CTA recommends that permission should be given and funds made available for the postponed study tour to the USA and Canada to take place in the first quarter of 1989.

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VI.D. Lectures by CTA

At the NPD's request, the CTA prepared and delivered three half-day lectures to an invited audience made up of staff from CDFDC, STRI, universities and other institutes, as well as a large number of engineers, technicians and managers from the dyeing, printing and finishing industries of the Greater Shanghai industrial region.

The topics chosen by the NPD were:

1. New technologies of low- and free-formaldehyde finishes.
2. New trends in finishing bearing in mind the needs of the West European market.
3. New potentials in flame-retardant finishes for cotton/polyester (Co/PE) blends.

As the CTA had received ample notice of the above lectures, he found it incumbent to spend some three weeks of his own time and money in perusing the current technical literature, drafting and typing the above lectures, preparing visual aids and approaching appropriate chemical and finishing machinery-manufacturers for brochures to illustrate and describe the new finishing agents and up-to-date machinery developments to which reference was being made in the three lectures. In the CTA's opinion, UNIDO & UNDP personnel are not fully aware of the input required from the CTA at his home base to perform his tasks at the duty station to the satisfaction of all concerned.

The first lecture, chaired by Mr. Cheng Cheng-Kang, Vice-Secretary General and Director of Project Planning, CDFDC, was very ably translated by Mr. Shi Hui Ming. Some 55 people attended and considerable interest was shown. The third lecture, chaired by Mr. Cai Zhong Fang, a Vice Director of CDFDC, was faultlessly translated by Mr. Qui Rong. Some 45 people attended and this lecture too was well received, followed by numerous questions after the lecture. Both these lectures were held on the premises of the STRI.

It was decided to hold the second lecture under the auspices of the Shanghai Textile Industry Bureau and the venue was the Shanghai Dyeing and Finishing Research Institute which had adequate facilities to accommodate an audience of some 220 people. The NPD, Mr. Zhou Wei Tao, chaired the meeting and translation was ably and competently provided by Mrs. Zhou Dexin. This prestige lecture, so well attended, was considered a success by all concerned. A number of senior representatives from the STIB, Institutes and Universities was present, including Professor Sun Kai, Director of the Dyeing and Finishing Faculty, China Textile University in Shanghai.

All three lectures are available in Chinese and English at CDFDC.

VI.E. Factory Visits

At the CTA's request, the NPD agreed to reduce the total number of factory visits from six to three in order to allow sufficient time for the preparation of the PPER. The following visits were made:

1, Shanghai General Corduroy Factory

Present: Mr. Zhang Kwang Jing-Production Manager

This enterprise, the only corduroy factory in Shanghai, was established in 1961 to produce cord and pile fabrics. Its output is very large: 48 million running metres p.a. of which 31 million are corduroy fabrics. Approximately 85% of their production is exported to some 60 countries, with East and West Germany, the USSR, Hong Kong, Thailand and Singapore the main outlets. The annual turnover is RMB 90.1 billion with a profit of RMB 98 million. Their activities comprise: weaving (at a different site), preparation, dyeing, printing, finishing and making-up (at a different site). We were shown numerous cord fabrics (about a dozen different types, the number of ribs/inch being one of the variables) and were told how seasons, style and fashion determined production. At present, most of their cord fabrics are made of 100% Co. but plans exist to have an increasing number of PE/Co blends in their range. The size of the works can be gauged by the existence of seven continuous dyeing and printing lines handling the output of some 2500 looms. This visit again confirmed the ingenuity and skill of Chinese management capable of producing fabrics of excellent quality and appearance on relatively old machinery. Plans are afoot to build a modern dyehouse on newly acquired land.

After the visit, the discussion centred on makes and performance of current raising machines, their present non-involvement in chemical finishing including resin finishing (but they intend to produce flame repellent cords with Pyrovatex CP (Ciba-Geigy) in the future), the effect of liquid ammonia treatment on 100% Co cords, the desirability or otherwise of producing cords with a soft handle. We advised Mr. Zhang to investigate the newly developed silicone microemulsions for this purpose. We also drew attention to the CTA's 2nd lecture at which silicone softeners were being discussed in extenso.

A very worthwhile visit which proved beneficial to both CTA/CDFDC and Mr. Zhang, who asked the CTA to obtain cord production figures for the UK, EEC and USA. The CTA has succeeded in obtaining UK figures, but production figures for the EEC and USA would require the commissioning of a market survey on a repayment basis. The information has been made available to CDFDC for transmission to Mr. Zhang.

2. Shanghai Knitting Factory

Present: Mr. Yu Qirong - Director

Mr. Cai Guanxiang - General Engineer

This factory, some 70 years old, is in the process of being modernised. Its four main activities comprise: warp and weft knitting, dyeing, finishing and making-up. Yarns used include: Co, PE, elastomeric, and other synthetics. The circular knitting machines are old (US Thomson), but the modern warp knitting plant is equipped with up-to-date West German Karl Mayer and East German Textima machines. The warp knitting plant was spotlessly clean, the machines were running smoothly and seemed well maintained. During our visit, the Karl Mayer machines, fitted with Jacquard harnesses, were knitting high-class patterned tablecloths.

The dyehouse had an assortment of atmospheric and high temperature beam and jet dyeing machines of East and West German, Japanese, Chinese, etc. origin. Whilst the wet processing facilities for warp knits were satisfactory, circular knits were prepared and dyed on old fashioned machinery under considerable tension, resulting in lengthway stretch and distortion. Finishing processes were little better; thus fabrics for sale were limp and lifeless with a poor handle.

Management subsequently stated that problems of whiteness, softness, elasticity and handle were of paramount concern and these shortcomings were discussed at length. The CTA advised that in the long run it was essential to modify their preparation procedures in order to obtain better husk and seed removal and thus improved whiteness. However, the crux of the problem was the unsuitability of their machinery for processing circular knits, and much time was spent in discussing the types of preparation, dyeing and particularly finishing machinery which were required to obtain fabrics of the right appearance, dimensions, handle and softness. As this enterprise would greatly benefit from applying the principles of the 'Starfish' project (developed by IIC), the opportunity was taken to leave a pamphlet summarising the objectives of 'Starfish' and its approach to the knitting and finishing of circular knit fabrics. The CTA undertook to provide names and addresses of finishing machinery manufacturers, whose equipment was essential to the success of producing dimensionally stable circular knits with good appearance and soft handle. This information has been made available by IIC and has since been sent to CDFDC for transmission to the management of Shanghai Knitting Factory.

3. Xin Yi Dyeing and Printing Mill

Present: Mr. Zhan Zi - Director

Mr. Zhan Bao Fa - Vice Director

Mr. Le Yu Zhang - " "

This is a brand new works established in May 1985 under the NPD's guidance. Machines were installed six months later and the factory was in production (for the home market) in 1986. The factory employs 730 staff and workers and covers an area of 65 mu = 42900 sq.m. Ample space exists for expansion including the erection of a warehouse and engineering workshops. Machinery was imported from six European countries, but the majority is of Chinese origin. The output at present consists of bleached and dyed Co and PE/Co fabric; a printing line will follow in due course. In 1987 a fair portion of the output was being exported and in 1988 exports amounted to 90%, thereby achieving their production target and managing to repay the foreign loan from the China Investment Bank for the purchase of Western machinery. The annual production is 17.3 million running metre which is 65% of total capacity. Their productive capacity is limited by shortages of gas, water and electricity, also of trained workers. Some 20 dyeing, printing and finishing mills provided technological help during the start-up of the mill and skilled workers can still be called upon for training etc. The mill has also attracted new graduates and retired technicians/skilled workers resulting in a marked upping of fabric quality. The award of a Certificate of Merit from the Shanghai Trade Inspection Bureau testifies to that achievement. The location of the mill in the countryside, but within easy access of Shanghai, has attracted workers and staff not only because of good working conditions, but wages and bonuses have increased annually. The present monthly bonus is RMB Y40. Amongst the disadvantages mentioned were: the high cost of transport (the factory is located on the East side of the Huang Pu river) and the distance from their suppliers (weaving mills mainly in the Shanghai are). Energy prices were also high and rising.

The visit to the factory revealed extensive modern buildings with good natural lighting and ample space. Owing to a power cut, a Sanforizer compressive shrinkage machine, a decatizing machine, a Ramisch glazing calender and various atmospheric and H.T. jiggers (2 Mezzera/Kleinewefers, a Vald Henriksen and several Chinese) were at a standstill. However, in another modern building a Brugman continuous rope scouring and bleaching range (operating at 100-120 m/m) and a Chinese open width scouring and bleaching range were in full production and so were two Chinese pad/thermosol-pad/steam ranges where disperse/reactive dyes were applied from a single bath to PE/Co blend fabrics followed by drying and thermosoling/heatsetting. The reactive dyes were subsequently fixed by steaming. The visit was of interest not only because it showed Chinese dyeing and finishing technology at its best, but also because a number of machines to be installed at the PP could be seen under production conditions

VII. CONCLUSIONS

The project appears to be on target as far as the activities and output of three 'Immediate Objectives' are concerned, viz. a/ RDD, c/ TD, and d/ ID. In particular the outputs of the RDD, but also those of the TD and ID, are gratifying as CDFDC has been successful in transferring the results of new R & D investigations to the dyeing and finishing industry not only in the Shanghai region but also further afield. CDFDC has attracted a great deal of financial support from both central and local government as well as from industry, providing ample indication that the "paymasters" are satisfied with its performance.

However, the project has failed to achieve its 'Immediate Objective' in respect of b/ the Pilot Plant (PP) because of numerous delays encountered, which have already been discussed in Section V.B. It is to be hoped that the 12 months delay in building the PP and the accompanying changes (curtailments) in projected machinery and hence versatility of processing will not adversely affect the stated 'Development Objective' and 'Output' of the Project. These are stated in the Project Document as:

To develop and apply modern processing technologies in the textile sector by establishing a PP fully equipped with machinery of Chinese origin and imported machinery and equipment capable of:

- i/ developing production scale processing procedures and
- ii/ providing development facility services to RDD, STRI and industry

In the CTA's opinion it is vital that sight is not lost of this 'Development Objective' in the present climate of economic stringency. It is also to be regretted that a target has been set for CDFDC to become financially self-supporting. In the CTA's experience such a move invariably leads to the curtailment and ultimate abandonment of development in favour of production

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VIII. ACKNOWLEDGEMENTS

The CTA wishes to put on record his thanks for the courteous reception accorded to him by Dr. Zhu Xing and his staff of the Department of International Cooperation, Ministry of Textile Industry, Beijing. The CTA was pleased to have had the opportunity of discussing with Dr. Zhu and his staff both the achievements and the problems encountered by the Project "Strengthening of the China Dyeing and Finishing Development Centre".

It is a pleasure to recall the banquet given by Dr. Zhu for the CTA and his wife at which Ms Caterina Benardelli represented UNDP, and Messrs. Cai Zhong Fang and Cai Pei Wei the CDFDC. This occasion provided an opportunity to meet informally a number of Dr. Zhu's colleagues from the Ministry of Textile Industry and the Ministry of Foreign Economic Relations and Trade.

A very good working relationship continues to exist between the NPD, his staff and the CTA. Meetings and discussions always take place in a spirit of cooperation and complete frankness, which is of benefit to the progress of the project. The efforts of a large number of members of CDFDC to be of assistance should be recorded; whether acting as escorts, or as interpreters during factory visits, lectures and on many other occasions. The CTA would also like to thank the NPD for making the visit to Nanjing possible.

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IX. ANNEX

A. Revised Work Plan

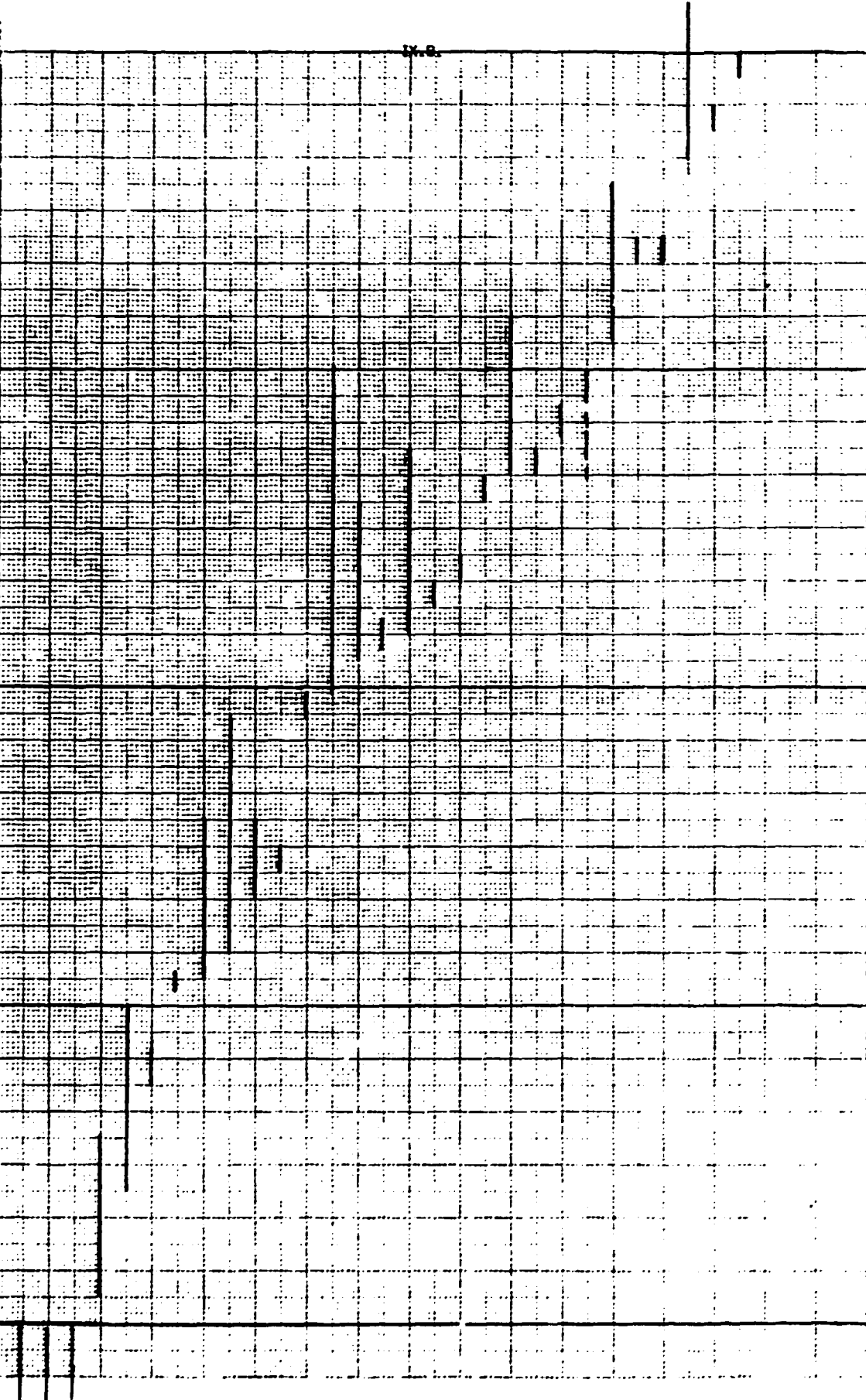
Preparatory Assistance (accomplished)	Feb/86
1. Drafting project document (accomplished)	Apr/86
2. Study Tour 1. (General identification, 5 persons, 35 days each, Japan, England, Austria; accomplished)	Oct/86
3. Fellows 1 and 2. (Start language school; accomplished)	Feb/87
4. Planning of 3000m ² building for Pilot Plant (PP) (Government; accomplished)	June/87
5. Technical Study Tour 1. (Technical survey, 6 persons, 35 days each, France, Italy, Hong Kong; accomplished)	Oct/87
6. CTA (First visit, 0.7m/m; accomplished)	Jan/88
7. Fellows 3 and 4. (Start language school; accomplished)	Feb/88
8. Fellowships 1 and 2. (6 months each to FRG and UK; accomplished)	Mch/May 88
9. Bids for equipment (unspecified)	May 88
10. Preparation expert (1m/m; accomplished)	June/ 88
11. CTA (Second visit, 1m/m; accomplished)	Nov/Dec 88
12. Construction work of PP building (delayed 12 months)	Dec/88
13. Fellows 5 and 6. (Start language school)	Feb/89
14. Technical Study Tour 2. (Technical survey, 6 persons 4 weeks, USA and Canada; delayed 4 months)	Feb/Mch 89
15. Fellowships 3 and 4. (6 months each to USA and UK; delayed 6 months)	Mch/Apr 89
16. Technical Information Systems expert (1m/m; delayed 6 months)	Apr/89
17. Dyeing expert (1m/m; possibly postponed by 12 months)	Apr/May 89
18. Finishing and Coated Fabric expert (1m/m)	Aug/89
19. Fellowships 5 and 6. (6 months each to USA and Switzerland; may be delayed)	Sep/89
20. Technical Study Tour 3. (Technical survey, 5 persons, 4 weeks, FRG, Switzerland and Spain)	Sept/89
21. CTA (Third visit; 1m/m)	Oct/Nov 89
22. Completion of PP building	Dec/89
23. Fellows 7 and 8. (Start language school)	Feb/90
24. Printing expert (1m/m; possibly put forward by 12 months)	May/90
25. Product Development expert (1m/m)	May/90
26. Fellowships 7 and 8. (6 months each to France and Japan)	Sept/90
27. CTA's last mission (Preparation for project termination)	Oct/90
28. Terminal Tripartite Review Meeting (with recommendation for future activities or future UNDP assistance)	Dec/90

Note:

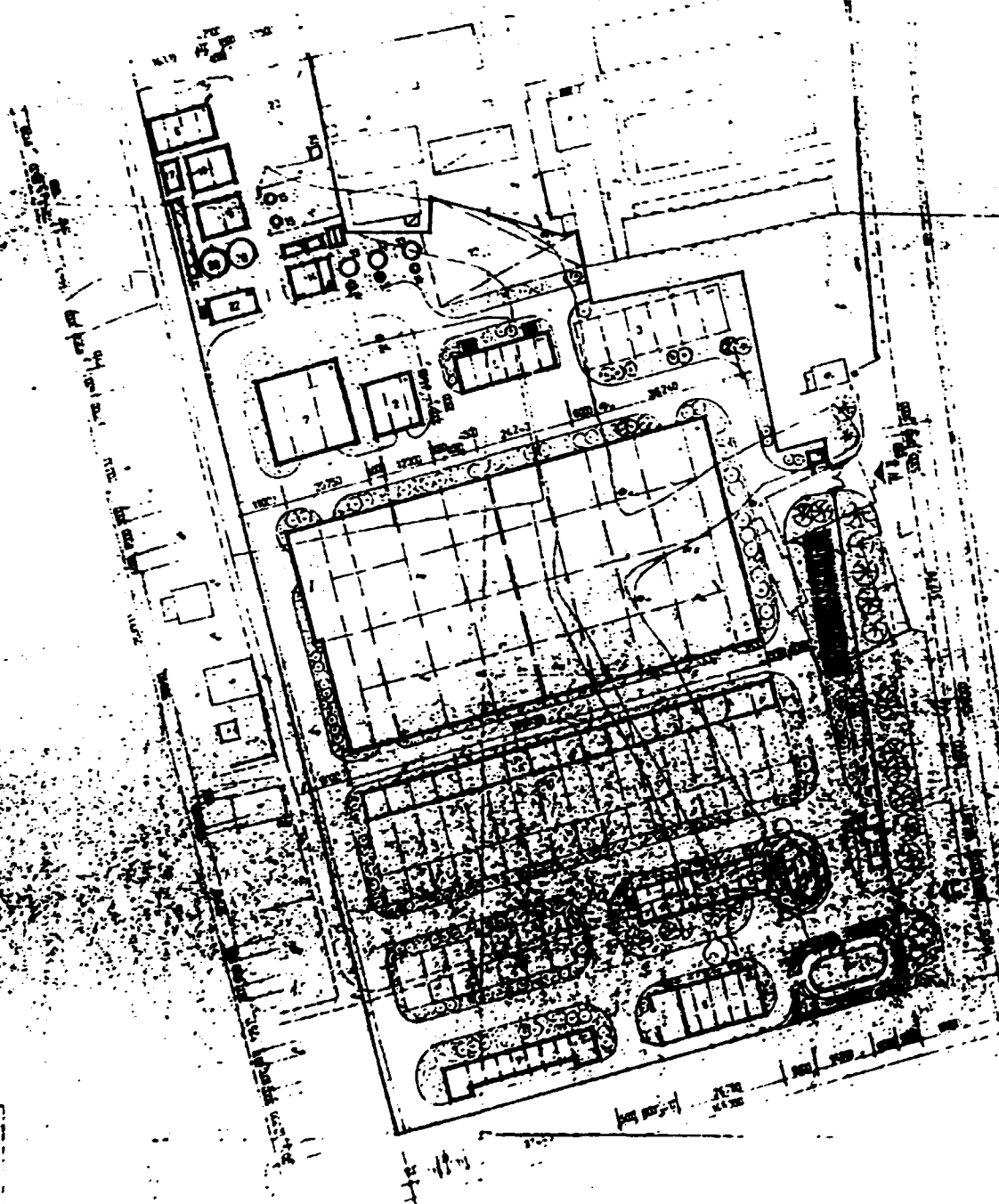
Timetable of commercial training is dependent on delivery and commissioning of imported machines.

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号	名	数量	规格	材料	号	名	数量	规格	材料
1	ASB	500.00	100.00		20	ASB	60.00		
2	ASB	57.00	57.00		21	ASB	60.00		
3	ASB	7.00	7.00		22	ASB	60.00	156	
4	ASB	50.00	50.00		23	ASB	170.00		
5	ASB	200.00	200.00		24	ASB	11.00		
6	ASB	11.00	11.00		25	ASB	20.00		
7	ASB	20.00	20.00						
8	ASB	8.00	8.00						
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28	ASB	60.00	60.00						
29	ASB	10.00	10.00						
30	ASB	60.00	60.00						

IX.C. KEY TO PP BLUE PRINT

- | | | |
|------------|------------|---|
| No. | 1. | Processing Plant for Preparation and Dyeing |
| | 2. | Boiler House |
| | 3. | Warehouse for Grey Goods |
| | 4. | Maintenance Workshop |
| | 5. | Garage/Showers |
| | 6. | Storage Shed for Dangerous/Inflammable Chemicals |
| | 7. | Dormitory for Single Men |
| | 8. | Office Building |
| | 9. | Reception |
| | 10. | Finishing Workshops |
| | 11. | Bicycle Store |
| | 12. | Coal Store |
| | 13. | Container for Dilute Alkali |
| | 14. | Storage Container for Concentrated Alkali |
| | 15. | Underground Storage for Dilute Alkali |
| | 16. | Container for Concentrated Alkali (NaOH) |
| | 17. | Waste Water Reservoir |
| | 18. | Reservoir for Neutralisation of Waste Water |
| | 19. | Aerating Filter Beds |
| | 20. | Sludge Treatment |
| | 21. | Second Sludge Treatment |
| | 22. | Chemical Laboratory |
| | 23. | Storage Buildings |
| | 24. | Chimney |
| | 25. | Pump Room |

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IX.D. PROJECT BUDGET/REVISION**UNITED NATIONS DEVELOPMENT PROGRAMME
MANDATORY REVISION**

Country: People's Republic of China
Project Title: Strengthening of the China Dyeing & Finishing Development Centre
Project No: CPR/87/017/B/01/99

This budget revision has been made to reflect the actual expenditure of 1987 and to rephase the savings to subsequent years.

The change to the project budget is as follows:

Previous UNDP Input - Budget Code "A"	\$1,476,522
Revised UNDP Input - Budget Code "B"	\$1,476,522
UNDP Input Increase/Decrease	NIL
Government cost-sharing	\$ 500,000

On behalf of the Government

Date

On behalf of the UNDP

Date

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PROJECT BUDGET SHOWING UNDP CONTRIBUTION
(IN US \$)

COUNTRY THE PEOPLE REPUBLIC OF CHINA
PROJECT NUMBER CPR/87/017/B/01/99
TITLE STRENGTHENING OF THE CHINA DYEING AND FINISHING
DEVELOPMENT CENTRE

			TOTAL		1987		1988		1989		1990	
			m/m	\$	m/m	\$	m/m	\$	m/m	\$	m/m	\$
10	PROJECT	PERSONNEL										
11.01	CTA		4.5	40,125			1.0	9,000	1.5	13,500	2.0	17,625
11.02	BLEACHING	EXPERT	.5	8,500			.5	8,500				
11.03	PRINTING	EXPERT	1.0	8,500					1.0	8,500		
11.04	INFORMATION	SYSTEM	1.0	8,500					1.0	8,500		
		EXPERT										
11.05	PRODUCT	DEVELOPMENT	2.0	17,000					1.0	8,500	1.0	8,500
11.06	COATED FABRICS		1.5	12,500					1.5	12,500		
11.07	DYEING	TECHNOLOGY	1.0	9,000					1.0	9,000		
11.51	SHORT-TERM	CONSULTANTS	1.5	13,500					1.0	9,000	.5	4,500
11.99	Sub-total		13.0	117,625			1.5	17,500	8.0	69,500	3.5	30,625

16	MISSION COST			22,000				4,000		14,000		4,000
16.99	Sub-total			22,000				4,000		14,000		4,000

19	Component	Total	13.0	139,625			1.5	21,500	8.0	83,500	3.5	34,625

30	TRAINING											
31	FELLOWSHIP		80.0	142,400			30.0	45,000	40.0	71,200	10.0	26,200
31.99	Sub-total		80.0	142,400			30.0	45,000	40.0	71,200	10.0	26,200

32	STUDY TOUR		18.0	117,836	6.0	37,275	7.0	38,900	5.0	41,661		

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PROJECT BUDGET SHOWING UNDP CONTRIBUTION
(IN US \$)

COUNTRY: THE PEOPLE REPUBLIC OF CHINA
PROJECT NUMBER: CPR/87/7/B/01/99
TITLE: STRENGTHENING OF THE CHINA DYEING AND FINISHING
DEVELOPMENT CENTRE

		TOTAL		1987		1988		1989		1990	
		m/m	\$.	m/m	\$	m/m	\$	m/m	\$	m/m	\$
32.99	Sub-total	18.0	117,836	6.0	37,275	7.0	38,900	5.0	41,661		
33	COMMERCIAL FELLOWSHIP	9.0	22,500			9.0	22,500				
33.99	Sub-total	9.0	22,500			9.0	22,500				
39	Component Total	107.0	282,736	6.0	37,275	46.0	106,400	45.0	112,861	10.0	26,200
40	EQUIPMENT										
41	EXPENDABLE EQUIPMENTS		26,000				6,000		10,000		10,000
41.99	Sub-total		26,000				6,000		10,000		10,000
42	NON-EXPENDABLE EQUIPMENT		1,020,000				300,000		500,000		220,000
42.99	Sub-total		1,020,000				300,000		500,000		220,000
49	Component Total		1,046,000				306,000		510,000		230,000
50	MISCELLANEOUS										
53	SUNDRY		8,161				3,000		2,300		2,861
53.99	Sub-total		8,161				3,000		2,300		2,861
59	Component Total		8,161				3,000		2,300		2,861

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PROJECT BUDGET SHOWING UNDP CONTRIBUTION
(IN US \$)

COUNTRY: THE PEOPLE REPUBLIC OF CHINA
PROJECT NUMBER: CPR/87/017/B/01/99
TITLE: STRENGTHENING OF THE CHINA DYEING AND FINISHING
DEVELOPMENT CENTRE

	TOTAL		1987		1988		1989		1990	
	m/m	\$	m/m	\$	m/m	\$	m/lt.	\$	m/m	\$
99. GRAND TOTAL	120.0	1,476,522	6.0	37,275	47.5	436,900	53.0	708,661	13.5	293,686
100 GOVERNMENT COST-SHARING		500,000				300,000		200,000		
109 Component Total		500,000				300,000		200,000		
999 UNDP INPUT		976,522		37,275		136,900		508,661		293,686

IX.E. List of Foreign and Chinese Machinery and Equipment

A.	<u>Full-Width Production Scale Machinery Acquired by CDFDC</u>	Actual Cost
1.	Jeans stone washing and treatment machine, Tupesa, Spain	\$ 27,500
2.	Rotary coating machine (head), Mitex Co., Spain	\$ 43,000
3.	Thermobrush design machine, Mortamot Co., France	FF480,000
B.	<u>Full-Width Production Scale Machines Required by CDFDC</u>	
4.	High pressure jigger (Vald Henriksen)	\$300,000
5.	High pressure jet/overflow rope dyeing machine (Bene)	\$180,000
6.	Calender (Ramisch-Kleinewefers)	\$200,000
C.	<u>Laboratory Equipment Required by CDFDC</u>	
7.	Laboratory drying and heat-setting unit (Benz)	\$ 20,000
8.	Flammability 45° Test Instr. (SUGA)	\$ 13,000
9.	Flammability Vertical Test Instr. (SUGA)	\$ 12,000
10.	Flammability Mushroom Test Instr. (U.S. Testing Co. Inc.)	\$ 12,000
11.	Laboratory dyeing machine with six independently working dyeing positions (AHIBA)	\$ 15,000
12.	Lab. jet/overflow pressure dyeing machine (Werner MATHIS)	\$ 20,000
13.	Peroxide & Alkali concentration testing instrument (KURABO)	\$ 20,000
D.	<u>Full-Width Production Scale Machines Required by CDFDC</u>	
	<u>Chinese Government Input</u>	Approximate price RMB Y
14.	One double face gas singeing machine (LMH - 003 AJ 180)	150,000
15.	One continuous preparation range: Pad/Steam/Wash - Pad/Steam/Wash (as installed at Xin Yi Dyeing & Printing Mill)	200,000
16.	Two jiggers (SM-135C - 180); already acquired	50,000
17.	Two pressure jiggers (M-141 - 180)	120,000
18.	One rope opener; already acquired	50,000
19.	One cylinder dryer	100,000
20.	One stenter (as installed at No. 7 Shanghai Dyeing and Finishing Factory)*	150,000
21.	One progressive shrinkage machine (LMH-751 - 180)	150,000
22.	Other miscellaneous machines and equipment	110,000

*The approximate prices given for the above Chinese manufactured machinery bear no relation to the cost of similar machines manufactured in Western Europe, USA and Japan. This comment applies to all machines listed and in particular to the stenter seen at No. 7 Dyeing & Finishing Factory. This machine was stated to have been built by the Shanghai Textile Machinery Factory with the help of Monforts technology. It was a combined clip and pin four chamber drying/heat setting stenter. It was equipped with Monformatic controls for width, speed and overfeed and was fitted with a Mahlo welt diagonal straightner. Electronic fabric guiding was of Chinese manufacture but the heat recovery system was designed by Monforts. The NPD stated that the PP would have a modified version of that stenter built by the Shanghai Textile Machinery Factory.

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