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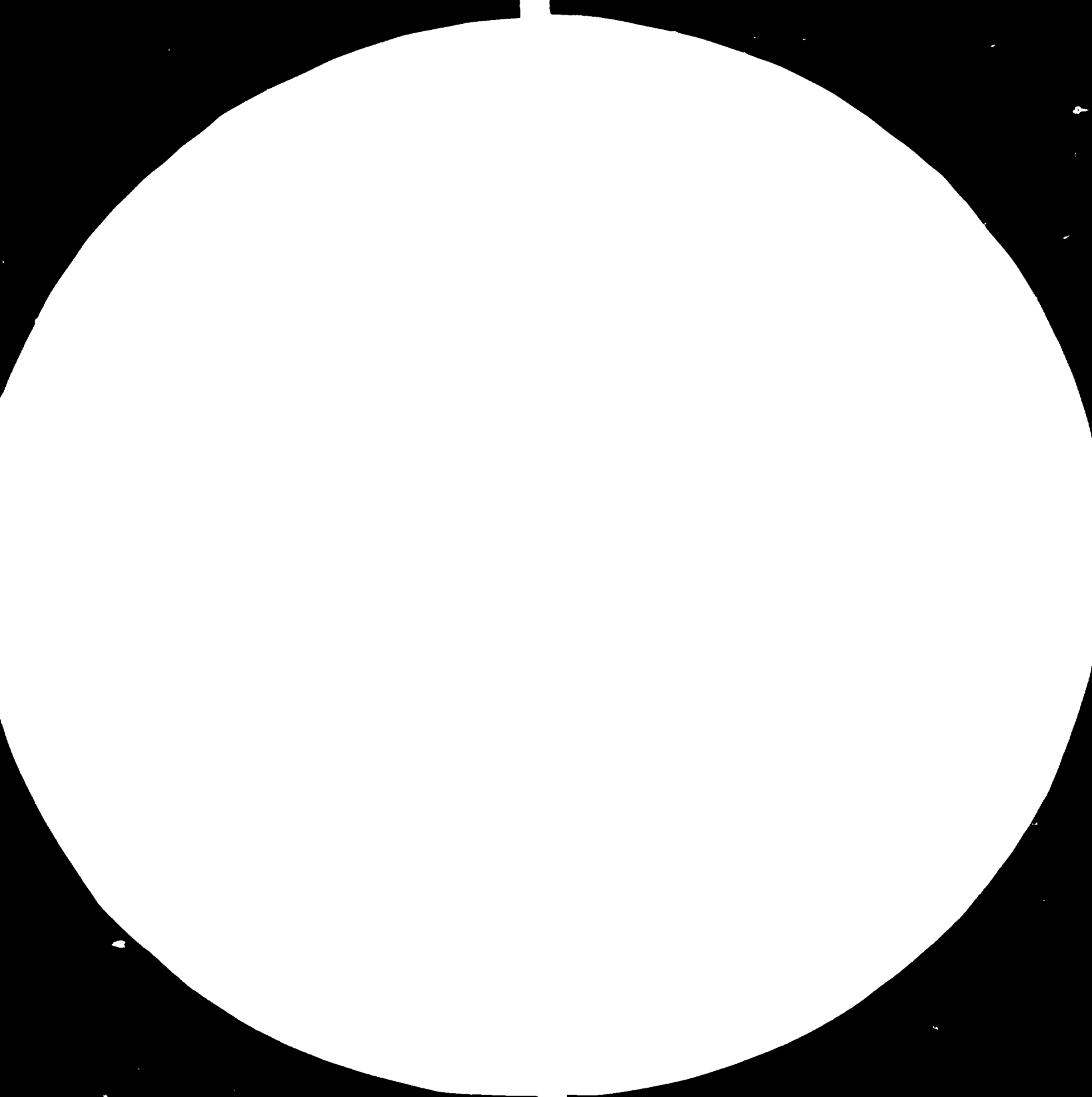
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(1 of 3)



UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO)  
(VIENNA)

FINAL REPORT  
FEASIBILITY STUDY FOR THE ESTABLISHMENT  
OF AN INTERNATIONAL CENTRE FOR INFORMATION,  
TRAINING AND DEVELOPMENT OF PHARMACEUTICAL TECHNOLOGY  
(ITPT)

UNIDO PROJECT UC/INT/82/102

VOLUME I

EXECUTIVE SUMMARY

Prepared by  
FOSTER WHEELER IBERIA, S.A. (FWM)  
FWM Reference: MDC 6012

October, 1983

## TABLE OF CONTENTS

	<u>Page number</u>	
<b><u>VOLUME I - EXECUTIVE SUMMARY</u></b>		
TABLE OF CONTENTS	i	
FOREWORD	v	
EXPLANATORY NOTES	vii	
INDEX OF TABLES, CHARTS AND DRAWINGS	ix	
<b><u>CHAPTER I - ABSTRACT</u></b>		
ARTICLE I-1	INTRODUCTION	I-1
ARTICLE I-2	PURPOSE OF THE FEASIBILITY STUDY	I-2
ARTICLE I-3	GENERAL CONSIDERATIONS	I-2
ARTICLE I-4	SPECIAL CONSIDERATIONS	I-5
ARTICLE I-5	GENERAL CONCLUSIONS	I-16
ARTICLE I-6	OBJECTIVES OF THE CENTRE	I-17
ARTICLE I-7	ACTIVITIES PERFORMED BY THE CONSULTANT	I-18
ARTICLE I-8	CONCLUSIONS OF THE MARKET SURVEY	I-21
ARTICLE I-9	PROPOSED ACTIVITIES AND PROGRAMME	I-26
ARTICLE I-10	CENTRE DEFINITION AND IMPLEMENTATION ALTERNATIVES	I-28
ARTICLE I-11	LOCATION CRITERIA	I-31
ARTICLE I-12	INSTITUTIONAL STATUS	I-32
ARTICLE I-13	SUMMARY OF INVESTMENT COST, OPERATING COST AND CENTRE'S REVENUES. RESULTS OF THE FINANCIAL EVALUATION. FINANCIAL SOURCES	I-34
ARTICLE I-14	RECOMMENDATIONS (PLAN OF ACTION)	I-38

	<u>Page number</u>
<u>CHAPTER II - ACKNOWLEDGEMENTS</u>	I-43
<u>CHAPTER III - COUNTERPARTS</u>	I-45
<u>CHAPTER IV-1 - PROJECT BACKGROUND</u>	
ARTICLE IV-1      PROJECT BACKGROUND	I-47
ARTICLE IV-2      PROJECT PROMOTER	I-48
ARTICLE IV-3      PROJECT HISTORY	I-48
ARTICLE IV-4      FEASIBILITY STUDY AUTHORS	I-49
<u>EXHIBIT I-1 - TERMS OF REFERENCE PROVIDED BY UNIDO</u>	-
<u>EXHIBIT I-2 - GENERAL INFORMATION ABOUT THE CONSULTANT (FOSTER WHEELER IBERIA, S.A.)</u>	-

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VOLUME II - POTENTIAL MARKET, ACTIVITIES AND  
DESCRIPTION OF THE ITPT CENTRE

TABLE OF CONTENTS	i
FOREWORD	v
EXPLANATORY NOTES	vii
INDEX OF TABLES, CHARTS AND DRAWINGS	ix
<u>CHAPTER I - CENTRE'S POTENTIAL MARKET SURVEY</u>	
ARTICLE I-1      INTRODUCTION	II-1
ARTICLE I-2      METHODOLOGY	II-1
ARTICLE I-3      SUMMARIZED STATISTICS FROM THE MARKET SURVEY	II-11
ARTICLE I-4      RESULTS FROM THE MARKET SURVEY. THE ITPT CENTRE PROGRAMME	II-55

	<u>Page number</u>
<u>CHAPTER II - THE ITPT CENTRE ACTIVITIES AND PROGRAMME</u>	II-59
<u>CHAPTER III - THE ITPT CENTRE FACILITIES DESCRIPTION</u>	
ARTICLE III-1 THE ORGANIZATION AND STAFF OF THE CENTRE	II-63
ARTICLE III-2 THE BUILDING DESCRIPTION AND ITS INSTALLATIONS	II-67
ARTICLE III-3 EQUIPMENT LIST	II-73
ARTICLE III-4 CONSUMABLES LIST	II-104
ARTICLE III-5 IMPLEMENTATION SCHEDULES	II-111
<u>EXHIBIT II-1 - QUESTIONNAIRE ISSUED TO DEVELOPING COUNTRIES</u>	-
<u>EXHIBIT II-2 - DESCRIPTIVE DRAWINGS</u>	-

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VOLUME III - FINANCIAL AND LEGAL MATTERS

TABLE OF CONTENTS	i
FOREWORD	v
EXPLANATORY NOTES	vii
INDEX OF TABLES, CHARTS AND DRAWINGS	ix
<u>CHAPTER I - INSTITUTIONAL STATUS</u>	
ARTICLE I-1 GENERAL CONSIDERATIONS	III-1
ARTICLE I-2 SUGGESTED POSSIBILITIES	III-5
ARTICLE I-3 MAIN ADVANTAGES AND DISADVANTAGES	III-6
ARTICLE I-4 SUGGESTED ASPECTS TO BE CONSIDERED IN THE IMPLEMENTATION AGREEMENT	III-7
ARTICLE I-5 ESTABLISHMENT IN THE HOST COUNTRY	III-10



	<u>Page number</u>
<u>CHAPTER II - FINANCIAL EVALUATION</u>	
ARTICLE II-1	INTRODUCTORY NOTE III-11
ARTICLE II-2	CENTRE'S MARKET FORECAST SUMMARY III-15
ARTICLE II-3	CENTRE'S SALES UNIT PRICES III-15
ARTICLE II-4	CENTRE'S CAPACITIES AND MAXIMUM OVERALL SALES CAPABILITY III-17
ARTICLE II-5	BASIS OF THE FINANCIAL STUDY III-19
ARTICLE II-6	INVESTMENT COSTS III-25
ARTICLE II-7	FINANCING COSTS III-29
ARTICLE II-8	OPERATING COSTS AND WORKING CAPITAL III-29
ARTICLE II-9	FINANCIAL EVALUATION III-34
ARTICLE II-10	CONCLUSIONS FROM THE FINANCIAL EVALUATION III-47
ARTICLE II-11	RECOMMENDATION III-48
	<u>EXHIBIT III-1 - COMPUTER RUNS FOR FINANCIAL ANALYSIS</u> -
	<u>EXHIBIT III-2 - FINANCING SOURCES</u> -

## FOREWORD

UNIDO, in response to a suggestion from groups of countries in the course of the First Consultation of the Pharmaceutical Industry held at Estoril, Portugal in December 1980, considered the possibility of establishing an International Centre for Information, Training and Development of Pharmaceutical Technology, hereinafter referred to as the ITPT Centre. It was envisaged that the Centre could undertake applied research and adapt technologies on behalf of governments and industry in developing countries as well as conduct related activities such as quality control, training personnel and providing technical information.

At a follow-up meeting held in Mohammedia, Morocco, on Co-operation, UNIDO announced that the Developing Countries were interested in establishing such a Centre and would soon discuss the project with UNIDO officials. It was suggested that the proposed Centre should concentrate on process development for drugs produced by chemical synthesis and by extraction from medicinal plants. It was understood that a research centre for producing drugs, in particular antibiotics by fermentation process, would be established with UNIDO support at another location.

As result of these discussions and further investigations, the requirements for a Feasibility Study were established and so stated in a Terms of Reference. These Terms of Reference were discussed with official banking institutions and modified accordingly to include their requirements covering the economic information presentation and content. These Terms of Reference are included in Exhibit I-1 to Volume I of this Feasibility Study.

This Feasibility Study has been done, therefore, in accordance with said Terms of Reference, and designed to provide techno-economical information and findings on the needs, objectives, activities, feasibility and definition of the ITPT Centre. The study consists of three (3) volumes, which are as follows:

o Volume I - Executive Summary

This volume contains information in a condensed form about the objectives of the Centre, activities of the consultant, results of the centre's potential market survey, the centre definition and operating costs, conclusions and recommendations. Cross-references to the Volumes II and III and to the Terms of Reference are given in this volume for those points that require a deeper investigation or supporting data and details.

o Volume II - Potential Market, Activities and Description of the ITPT Centre

This volume covers in detail the potential market survey, the summarized statistics resulting from the survey, the various alternatives for the ITPT Centre facilities, its installation and equipment, its staff, implementation schedule and descriptive drawings.

EXHIBIT II-1 - contains the questionnaire issued to developing countries.

o Volume III - Financial and Legal Matters

This volume deals with the considerations and possibilities investigated for the legal situation of the ITPT Centre, and with the financial evaluations for the various alternatives proposed. Detailed cost schedules (both for investment and operating costs), income schedules, and financial evaluation factors, curves and calculations are included herein.

This study has been prepared by Foster Wheeler Iberia in accordance with the Terms of Reference and the agreements reached with the United Nations Industrial Development Organization (UNIDO). The group that performed the study, their background and activities for this study, and Foster Wheeler Iberia's background have been presented in Volume I, Chapter IV, Article IV-4, and in EXHIBIT I-2.

In general the external sources of information utilized in the preparation of this study have been:

- UNIDO Publications
- WHO Publications
- IMS Publications
- SRI Reports
- IRL Reports
- Foster Wheeler data bank
- SCRIPT and other medical and pharmaceutical publications
- ABS Publications

## EXPLANATORY NOTES

A dash (-) is used to indicate amounts that are nil or negligible.

A blank means that information is not given or is not applicable.

A slash between dates (e.g. 1982/1983) indicates a financial year.

The use of a hyphen between dates (e.g. 1980-1983) indicates the full period involved (e.g. beginning of 1980 until end of 1983).

A period (.) is used to indicate decimals.

A comma (,) is used to distinguish thousands and millions.

Percentage rates, commissions, fees, etc. are per annum, unless otherwise indicated.

References to "tons" are to metric tons.

Totals may not add up precisely because of rounding off.

In addition to common abbreviations, symbols and terms, the following abbreviations have been used in this study:

### General

TOT	Transfer of Technology
NGO	Non-governmental organization
p.a.	Per annum
LDC	Less developed country
ITPT	International Centre for Information, Training and Development of Pharmaceutical Technology
NCE	New chemical entity
OTC	Over the counter sold drugs
Bulk Drugs	Drugs used as raw materials to produce formulated finished forms
SD	Synthetic drug
MPDD	Medicinal plant derived or extracted drugs
QC	Quality control
PP	Pilot plant
n.a.	Not applicable

### Financial or Economic

LIBOR	London interbank offered rate
SIBOR	Singapore interbank offered rate
DFC	Development finance company
f.o.b.	free on board
SDR	Special drawings rights

### Organizations

UNIDO	United Nations Industrial Development Organization
EEC	European Economic Community
IFC	International Finance Corporation
IBRD	International Bank for Reconstruction and Development (World Bank).
IDA	International Development Association
OAPEC	Organization of Arab Petroleum Exporting Countries
OPEC	Organization of Petroleum Exporting Countries
OECD	Organization for Economic Co-operation and Development
IMF	International Monetary Fund
UNCTAD	United Nations Commission on Trade and Development
UNDP	United Nations Development Programme
WHO	World Health Organization
FWM	Foster Wheeler Iberia (Consultant)

The description and classification of countries and territories in this study and the arrangement of the material do not imply the expression of any opinion whatsoever on the part of the secretariat of UNIDO or the consultant concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries, or regarding its economic system or degree of development.

Mention of company names and commercial products does not imply the endorsement of UNIDO or the consultant.

## INDEX TO TABLES, CHARTS AND DRAWINGS

		<u>Page number</u>
 <b><u>VOLUME I - EXECUTIVE SUMMARY</u></b>		
TABLE I-1	SUMMARY OF EXPECTED OVERALL REVENUES	I-24
TABLE I-2	ILLUSTRATIVE BREAKDOWN OF SERVICES	I-25
TABLE I-3	SUMMARY OF INITIAL INVESTMENT COST	I-34
TABLE I-4	SUMMARY OF OPERATING COST (Current Values)	I-35
TABLE I-5	SUMMARY OF FINANCIAL EVALUATION	I-36
 <b><u>VOLUME II - POTENCIAL MARKET, ACTIVITIES AND DESCRIPTION OF THE ITPT CENTRE</u></b>		
METHODOLOGY DIAGRAM Nº 1	SYNTHETIC DRUGS	II-5
METHODOLOGY DIAGRAM Nº 2	MEDICINAL PLANT DERIVED DRUGS	II-6
METHODOLOGY DIAGRAM Nº 3	FORMULATION AND PACKAGING PILOT PLANTS	II-7
METHODOLOGY DIAGRAM Nº 4	ANALYTICAL AND QUALITY CONTROL UNIT	II-8
METHODOLOGY DIAGRAM Nº 5	TRAINING SERVICES	II-9
METHODOLOGY DIAGRAM Nº 6	ENGINEERING AND ADVISORY SERVICES	II-13
 TABLE II-1-A	 SUMMARY OF ESSENTIAL DRUGS CLASSIFIED BY THERAPEUTIC GROUPS	 II-13
TABLE II-1-B	RAW MATERIALS AND INTERMEDIATES REQUIRED TO PRODUCE ESSENTIAL DRUGS	II-17
TABLE II-1-C	CONSUMPTION OF PHARMACEUTICAL PRODUCTS IN THE WORLD	II-23

		<u>Page number</u>
TABLE II-1-D	CONSUMPTION OF PHARMACEUTICAL PRODUCTS IN SELECTED DEVELOPING COUNTRIES	II-24
TABLE II-1E	CONSUMPTION OF PHARMACEUTICAL PRODUCTS BY THERAPEUTIC GROUPS	II-23
TABLE II-II	PREVAILING DISEASE PATTERN IN DEVELOPING COUNTRIES (By Regions)	II-25
TABLE II-III-A	TOTAL POPULATION INCREASE & AVERAGE ANNUAL GROWTH RATES FOR DEVELOPING COUNTRIES TO YEAR 2000	II-26
TABLE II-III-B	SOCIO- ECONOMIC PROFILE IN SELECTED DEVELOPING COUNTRIES	II-27
TABLE II-IV	ESSENTIAL DRUGS REQUIRED IN DEVELOPING COUNTRIES IN RELATION WITH PREVAILING DISEASES	II-30
TABLE II-V	PHARMACEUTICAL INDUSTRY PROFILE IN SELECTED DEVELOPING COUNTRIES	II-31
TABLE II-VI	SELECTED DRUGS REQUIRED AND WHICH HAVE A POTENTIAL TO BE PRODUCED IN DEVELOPING COUNTRIES	II-35
TABLE II-VII	RAW MATERIALS AND INTERMEDIATES REQUIRED TO PRODUCE ESSENTIAL DRUGS WITH TOP PRIORITY	II-36
TABLE II-VIII-A	AVAILABLE TECHNOLOGIES TO PRODUCE SELECTED ESSENTIAL DRUGS WHICH SHOULD HAVE PRIORITY. PATENT STATUS AND SOURCES	II-37
TABLE II-VIII-B	ILLUSTRATIVE USAGE OF OPERATING PROCESSES BY THERAPEUTIC GROUPS	II-38
TABLE II-IX-A	MEDICINAL PLANTS AVAILABLE IN DEVELOPING COUNTRIES AND THEIR ACTIVE SUBSTANCES BY THERAPEUTIC GROUPS. QUALITATIVE MARKET STATUS AND TREND	II-44
TABLE II-IX-B	DEVELOPING COUNTRIES MEDICINAL PLANT MATERIAL EXPORTS TO THE E.E.C. AND THE U.S.A.	II-48

		<u>Page number</u>
TABLE II-X	MEDICINAL PLANT DRUGS SUITABLE AND RECOMMENDED FOR PRODUCTION BY DEVELOPING COUNTRIES	II-49
TABLE II-XI	TECHNOLOGIES REQUIRED TO PRODUCE RECOMMENDED MEDICINAL PLANT DERIVED DRUGS. PATENT STATUS	II-50
TABLE II-XII-A	SELECTED ESSENTIAL DRUGS SUITABLE TO BE PURCHASED IN BULK FORM	II-52
TABLE II-XII-C	DIFFERENT TYPES OF FORMULATIONS	II-52
TABLE II-XII-B	ANCILLARY PRODUCTS REQUIRED TO FORMULATE DRUGS	II-53
TABLE II-XIII	RELATIVE IMPORTANCE OF DEVELOPED AND DEVELOPING COUNTRIES AS DRUG MARKETS	II-54
-----	ORGANIZATION CHART	II-65
TABLE II-XIV	DETAILED BREAKDOWN OF THE STAFF FOR THE VARIOUS ALTERNATES	II-66/67
SCHEDULE II-1	CONSTRUCTION SCHEDULE	II-112
SCHEDULE II-2	SCHEDULE FOR START OF ACTIVITIES	II-113
DRAWING 6012-A1-4701	GENERAL PERSPECTIVE	-
DRAWING 6012-A1-4702	ELEVATION	-
DRAWING 6012-A1-4703	SECOND BASEMENT	-
DRAWING 6012-A1-4704	FIRST BASEMENT	-
DRAWING 6012-A1-4705	GROUND FLOOR	-
DRAWING 6012-A1-4706	FIRST FLOOR	-
DRAWING 6012-A1-4707	SECOND FLOOR	-
DRAWING 6012-A1-4708	THIRD FLOOR	-



**VOLUME III - FINANCIAL AND LEGAL MATTERS**

TABLE III-1	UNIT SALES PRICES COMPARISON	III-16
TABLE III-2	ILLUSTRATIVE EXAMPLE FOR AVERAGE OR STANDARD SALE PRICES OF SERVICES	III-16
TABLE III-3	ITPT CENTRE OVERALL SALES CAPABILITY	III-20
SCHEDULE III-I-A	ESTIMATE OF INVESTMENT COST: PRE-IMPLEMENTATION CAPITAL EXPENDITURES	III-26
SCHEDULE III-I-B	ESTIMATE OF INVESTMENT COST: FIXED INVESTMENT COST	III-27
SCHEDULE III-I-C	SUMMARY SHEET, TOTAL INITIAL INVESTMENT COST	III-28
SCHEDULE III-2-A	ESTIMATE OF INDUSTRIAL COST	III-30/31/32
SCHEDULE III-2-B	WORKING CAPITAL DEFINITION	III-33
SCHEDULE III-3-A/B	BALANCE SHEETS (Base Case A and Alternate 3)	III-40/41
SCHEDULE III-4	SUMMARY OF EVALUATION RESULTS (Sensitivity Analysis)	III-42
CHARTS III-1-A/B	SENSITIVITY ANALYSIS TO INTEREST RATE (Base Case A and Alternate 3)	III-44/45
CHARTS III-2-A/B	SENSITIVITY ANALYSIS TO SALES, SALARIES AND INVESTMENT (Base Case A and Alternate 3)	III-44/45
CHARTS III-3-A/B	BREAK-EVEN POINT (Base Case A and Alternate 3)	III-46

ABSTRACTI-1 INTRODUCTION

Developing countries would like to improve their health pattern and the economics of their health systems. These countries have their own specific problems with regard to the incidence of disease coupled with populations that are expanding at explosive rates. Many different United Nations Organizations and the World Health Organization are trying to assist them in achieving these objectives as explained at the International Conference on Primary Health Care, held at Alma-Ata (U.S.S.R.) in September 1978. Formerly, the United Nations Lima Declaration on Industrial Development and Co-operation, held at Lima (Perú), in March 1975, summarized and stressed the economics of health. UNIDO is doing technical assistance, consultations and meetings towards the objective to develop this industry in developing countries.

Issues were highlighted in the First Consultation Meeting on the Pharmaceutical Industry, and international understanding is required to achieve the objectives. A group of developing countries requested help to be able to cooperate among themselves in fields such as manpower policies, technology acquisition and transfer, and industrial infrastructure. Also during this First Consultation Meeting the developing countries requested UNIDO to help them to develop those parameters mentioned above, one of which is to build-up the development of manpower and provide long term assistance for their pharmaceutical industry.

As per this request UNIDO has conducted through Foster Wheeler Iberia the present study related to the establishment of an International Centre for Information, Training and Development of Pharmaceutical Technology, according to the Terms of Reference attached in EXHIBIT I-1, Volume I. These Terms of Reference have been discussed with the World Bank who suggested that enough technical, financial and legal data be provided in the Feasibility Study so as to follow the pattern used by financing institutions to demonstrate the financial viability of the Centre so that its implementation can proceed. The World Bank suggestions have been incorporated in the Terms of Reference and therefore have been fulfilled in this Feasibility Study.

### I-2 PURPOSE OF THE FEASIBILITY STUDY

The purpose of this Feasibility Study, in response to points 2 and 3 of the Terms of Reference, is:

- To establish the objectives of the International Centre for Information, Training and Development of Pharmaceutical Technology (ITPT).
- To define the scope and programme of activities of the ITPT.
- To identify the location and size of the potential market for the activities of the ITPT.
- To identify and define the various alternatives for the International Status of the ITPT.
- To define the facilities of the ITPT, its staff and organization.
- To establish the timetable for the implementation of the Centre.
- To evaluate the implementation and operating costs of the ITPT.
- To evaluate the financial viability of the Centre and to define the moment when the Centre will become economically self-supporting on the basis of being a non-profit Centre.
- To identify and suggest financial sources to provide the required funding up to the moment when the Centre becomes economically self-supporting.
- To establish the criteria and conditions for selection of the site where the Centre could be installed.

### I-3 GENERAL CONSIDERATIONS

These General Considerations respond to point 3 of the Terms of Reference.

- A. The United Nations Lima Declaration on Industrial Development and Co-operation, of March 1975,<sup>(1)</sup> having examined the situation with respect to industrialization in the developing countries, bearing in mind resolutions 3201 and 3202 of May 1, 1974 adopted at the Six Special Session of the United Nations General Assembly on the Declaration and Programme of Action on the Establishment of a New International Economic Order, and recognizing the urgent need to bring out the establishment of such new international economical order based on equity, interdependence and co-operation, stated and declared the principles, plan of action, guidelines and

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(1). Lima Declaration and Plan of Action on Industrial Development and Co-operation Lima, Perú, March 1975. UNIDO Publication PI-38

recommendations to accelerate the industrial development of developing countries, whose share in total world industrial production should be at least 25 per cent by the year 2000, while making every endeavour to ensure that the industrial growth so achieved is distributed among developing countries as evenly as possible.

The Plan of Action emphasizes the formulation of long term industrialization plans and strategies which rest on national effort, which are adapted to the characteristics of each country in the light of its social and economic structures, and which take into account the potential raw materials and human resources of such countries, with the object of achieving the highest degree of interaction between industry and the other sectors of the economy. It also emphasizes the achievement of the highest degree of efficiency, manpower development programmes and professional training, stimulation of applied scientific research, technological adaptation and innovation, industrial information and standardization and the elaboration of programmes and policies of research and development adapted to the individual requirements and priorities of developing countries. All this is specifically applicable to the Pharmaceutical Industry, which is a part of the industrial organization.

The U.N. Lima Declaration also stated in the Institutional Arrangement the role of UNIDO in the Declaration and Plan of Action in the Establishment of a New International Economic Order.

- B. The Second Panel Meeting of Industrial Experts on the Pharmaceutical Industry, (1) held at Vienna in February/March, 1978 discussed and set forth the criteria for selecting drugs for local production in developing countries; discussed and modified a list of twelve drugs prepared by UNIDO suitable for local production; agreed the guidelines for the selection of products on which formulation activities could be concentrated in those countries where the pharmaceutical industry was starting to develop; discussed the methods available for transfer of technology, their advantages and disadvantages, and the conditions for the acquiring of these technologies. The Conclusions and Recommendations of the Meeting encouraged the co-operation with international pharmaceutical companies and among developing countries and the importance and convenience of the participation of International Organizations in the development programme for the pharmaceutical industry in developing countries, either for synthetic drugs or for medicinal plant extracted drugs, as UNIDO was examining countries with such plant products, presently now largely being exported in their crude forms, practically without any added value .
- C. In September 1978, the International Conference on Primary Health Care, at Alma Ata (U.S.S.R.) (2) declared the need for urgent action to protect and promote the health of all people of the world and the need for Primary

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(1) Report of the Second Panel Meeting of Industrial Experts on the Pharmaceutical Industry, Vienna, Austria, March, 1978. UNIDO Publication ID/WG-267 /1,2,3,4,5

(2) Primary Health Care. Report of the International conference at Alma-Ata; URSS, september 1978; WHO Publication ISBN-92-4-154135-0.

Health Care based on a practical, scientifically sound and socially acceptable level of health for all the people of the world by the year 2000 through a fuller and better use of world resources.

The close interrelationship of health with social and economical development calls for a strong coordination among all these activities at national, regional and local levels. In connection with this, health programmes require a financial effort which must be coordinated with all economic and social activities and resources, calling therefore for a careful analysis of the economics of health.

In this conference, UNIDO made a statement highlighting the importance of the supply of drugs in the primary health care programme. In many developing countries the cost of pharmaceutical products was very high and almost half of the total expenditure of these countries was for health care, a figure that was three times the proportion of developed countries. A long term program for the rational development of an integrated pharmaceutical industry is therefore required, responding to the priority needs for preventive and curative health care.

Recommendations 14, 20, and 121 of the Alma-Ata International Conference on Primary Health Care (1) establish again the need of an International Centre aimed to fulfill the requirements on pharmaceuticals, as one of the media to attain the envisaged health in the world.

- D. In April 1980 the Global Preparatory Meeting and then the First Consultation Meeting on the Pharmaceutical Industry held at Estoril (Portugal), (2) in December 1-5, 1980 spelled out the issue of a committee of experts in the pharmaceutical industry dedicated, among other activities, to assist developing countries in the production of the UNIDO twenty six essential drugs in bulk form and their intermediates; to provide information and assistance on prices and transfer of technology and to undertake detailed studies on relevant issues considered to be in connection with the above items. These tasks could be performed by the ITPT Centre and therefore a potential market for information and advisory services exists, and the need to satisfy this demand has been agreed by the developing countries.

#### I-4 SPECIAL CONSIDERATIONS

##### A. Drug Consumption and Pharmaceutical Industry

The difficulties that developing countries find in the development of their

- 
- (1) Primary Health Care Report of the International Conference at Alma-Ata U.R.S.S., September 1978; WHO publication ISBN 92-4-154135-0
- (2) First Consultation Meeting on the Pharmaceutical Industry, Estoril (Portugal), December 1980, Report, UNIDO Publication ID/NG-331/1,6,8,10.

pharmaceutical industries are far more complex than those associated with the growth of most other industries. They range from the strictly technological problems (to obtain know-how and to foster innovation) to the economic difficulties to reduce costs in procurement, production and marketing of products, through the medical difficulties to ensure rational and effective therapeutic practice and the difficulties arising out of the social, legal and political structures. The pharmaceutical industry provides products that are essential to the immediate welfare of the population and which cannot be replaced by other products. However, the needs of health care can not be met simply by importing all the necessary drugs from the developed countries. On the other hand, the pharmaceutical industry offers substantial tangible economic benefits to all countries if local production is undertaken.

Developing countries demand for pharmaceuticals will increase considerably in the future to improve the general standard of living and the health of a population with high growth rates and low health care facilities at present time. Therefore, there will be the need to increase imports or to establish pharmaceutical industries in the developing countries.

Developing countries interested in the establishment of pharmaceutical industries should recognize that the special conditions required, complicated by an economically unbalanced situation which may exist in a developing country, necessitate careful planning of any step towards the establishment of a pharmaceutical industry. The permanent availability of advice on local therapeutic needs and on technological progress in the manufacture and control of drugs is highly desirable, and therefore, the existence of a centre, as proposed in this study, that satisfies this demand.

As the pharmaceutical industry is quite sophisticated and is usually linked to a well developed chemical industry, developing countries often have difficulties in establishing pharmaceutical production. The formulation, tableting and packaging of pharmaceutical products, however, amount to about 40 per cent of their total cost, and the technology and know-how of these operations are simple, so that developing countries that have a domestic market for these products could produce them from imported bulk materials. Considerable savings in foreign currency could be achieved in this way. There is, therefore, a market for formulation and packaging plants design, applied technology research and know-how acquisition that the ITPT could fulfill and that the developing countries could use (see Volume II, Chapter I, for details).

Besides savings in foreign exchange, local production offers additional advantages for the developing country industrialization, as it enables establishment of testing laboratories, the installation of training and education centres and the diffusion of technology for the use of many natural products and extracts whose medicinal properties are already known or are in process of screening, research and development.

### B. Technology situation and requirements

For countries that already possess formulation and packaging facilities, the expansion and improvement of local industry is a difficult task because of the more complex technology requirements when manufacture of bulk chemicals is envisaged. The development of local manufacture of chemicals in bulk can substantially reduce the cost of obtaining such products. Much of the technology for the bulk production of essential drugs can be transferred by more advanced developing countries since it is both more economical and better adapted to the needs of less-industrialized countries.

The technological requirements of developing pharmaceutical industries at this level are greater than those in the initial stages. Highly developed chemical and pharmaceutical skills, sophisticated process "know-how", formulation and packaging, applied research and extensive quality control facilities, are all an important part of this industrial development. Furthermore, applied research, development and training may also be undertaken once production units have reached a certain minimum size. It should be noted, however, that a successful research programme may be extremely costly and risky and beyond the reach of individual enterprises in developing countries.

Because of the high investment required, the lack of technology transferred to developing countries, too many ties to sources of intermediates, and because proper pre-feasibility and feasibility studies have not been carried out many pharmaceutical projects in developing countries have failed.

In addition, the pharmaceutical industry in developing countries has not used local raw materials. Medicinal plants have been exported generally in bulk form without having value added to them in the country of origin.

It can be concluded from the above facts, that there is a need to investigate the adaptation and transfer of technology to the developing countries and to foster the use and application of local raw materials and available medicinal plants. This need is by itself a market for any institution that could accomplish this task, and the ITPT centre could do it.

### C. Failure of previous projects

Among others, the following are the main reasons why many pharmaceutical industrial projects failed in developing countries.

- a). Only medical concepts were considered, and not industrial concepts together with the medicinal ones.
- b). The overall concepts of pharmaceutical industry were not looked at and proper global studies were not performed.

- c). There was no basis of research and development to back up the new industry. Therefore there was no chance to improve the technologies, as it is not possible to develop synthesis or fermentation processes without research. The need to carry on local research and development to absorb, assimilate and further develop the technology acquired, was agreed and recognized by developing countries in the First Consultation Meeting, (1) and so stated in issue III-3 as an agreed recommendation.

Medicinal plant derived drug production, where technological requirements are more accessible, could be one of the first steps because of the existence of local raw materials (the medicinal plants), and the development of the appropriate technologies an irrefutable need which a centre like that proposed in this study could fulfill.

- d). Key personnel are lacking in developing countries. The production of pharmaceuticals, with its associated activities, such as quality control and packaging, are skill-intensive activities. Hence the local production of drugs is only feasible when a developing country has an adequate supply of skilled personnel available. These will not only include graduates engineers and chemists, but technologist, fitters and other plant operatives. An adequate educational system, including university and technical colleges, is a prerequisite for the production of pharmaceuticals and, ideally, some previous experience in the production of fine chemicals is an advantage. Personnel with the appropriate background and suitable qualifications and experience will be involved in manufacture, formulation, packaging, distribution and selling of the products concerned. Training for this personnel will be required, unless developing countries wish to depend on expatriates from industrialized countries. Therefore, technicians and university graduates must be trained, since personnel is an important factor in establishing any sector of this industry. Such personnel could be trained in a pharmaceutical enterprise, in courses arranged by associations of pharmacists or pharmaceutical industries, in educational institutions at both undergraduate and graduate levels, through the use of grants or fellowships in foreign countries or by specific training from advisors supplied by the United Nations or other concerned organizations. However, a training centre, accessible to specific regions, where equipment in various scales for the manufacture of tablets, ampoules and other dosage forms could be made available for practical use and study and for developing experience in repair and maintenance of equipment would be a better solution. In addition, the trainees would be filled in about the important aspects of necessary pharmaceutical documentation. The proposed ITPT Centre accounts for these needs, whose existence justifies the inclusion of this aspect in the concept of the Centre. The need for personnel training was recognized in the First Consultation Meeting (1) and stated in a recommendation within issue 3.

(1) First Consultation Meeting on the Pharmaceutical Industry, Estoril (Portugal), December 1980, UNIDO Publications ID/WG-331/1/6/8/10



- e). The large investment required, the financial problems involved, the limitations to export products, the rigidity of most plants, and the lack of funds from official banking institutions were additional reasons for failure of previous projects. Such projects proved not to be financially feasible. The case histories of India, Pakistan and Mexico should be kept in mind. Therefore, the need to study the economics of the projects is obvious and this is something that the ITPT Centre would provide to developing countries.

D. Quality Control

It is important to note that adequate quality control procedures are necessary for both drugs which are purchased and those which may be produced in new installations. Furthermore, this need of rigid quality control of purchased and sold raw materials, intermediates and finished products was recognized in the First Consultation Meeting (issue 3) (1). Analytical specifications of raw materials and intermediates are available from various sources like pharmacopeias, national standards institutes and technology transfer packages. Pharmaceutical preparations produced in developing countries should be controlled to establish their therapeutic equivalence to standard preparations. The aim of pharmaceutical quality control is to achieve sustained and uniform manufacture of products of desired quality. Raw material and product specifications are necessary to determine their suitability and the quality of end products. Quality control is more important in pharmaceutical manufacture than for other sectors of the chemical industry. This requires a high degree of skill, sophisticated equipment, close supervision and strict adherence to laid-down good manufacturing procedures. Failure to observe adequate quality control will result in poor quality drugs with their inherent dangers to the public. This feature is one that cannot be overlooked and is where the multinational firms have advantages. Attempts to displace these firms by introducing poor quality local drugs in some countries have not been successful. Developing countries must not only have adequate controls for their own manufacture but must ensure that products imported into their territories comply with equivalent standards. Countries which plan to export their raw materials or finished products must be well informed of the quality standards they must maintain. Extensive quality control products and testing facilities are not available in most developing countries, but the development of purchasing and analytical control systems that ensure that all materials meet the specifications is important, and the developing countries should establish them. However, it may be difficult to harmonize the criteria to establish such quality control systems and to guarantee their independence and objectiveness. It is therefore justified that the establishment of procedures and the analysis of samples be carried out by independent entities or laboratories, and the ITPT laboratories could do it as a service to developing countries. The harmonizing of policies could also be coordinated by the advisory group of the ITPT Centre. Therefore the market for quality control and advice exists and the ITPT Centre could satisfy it and sell these services.

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(1) First Consultation Meeting on the Pharmaceutical Industry, Estoril (Portugal) December 1980, UNIDO Publication ID/WG-331/1/6/8/10.

### E. Medicinal plant derived drugs

At the preparatory meetings to select issues for discussion at the First Consultation on the Pharmaceutical Industry, (1) several participants stressed the important role that medicinal plants should play in developing countries, since these countries have suitable raw material resources which are either underutilized or neglected. The First Consultation Meeting on the Pharmaceutical Industry (1) recognized that essential and well defined products based on medicinal plants along with the 26 essential drugs identified by UNIDO, constitute an illustrative list for undertaking basic manufacture in developing countries.

In the last century, medicinal plants have developed new applications as raw materials for bulk drugs and intermediates, besides their customary use in traditional medicine. The empirical clinical benefits, of this natural pharmacopoeia led to characterize new plant drugs by isolating their active principles.

The high cost of chemical drugs encouraged a number of developing countries to complement modern medicine with traditional medicine to spread health care coverage to the majority of the population at reasonable cost. In general, it is cheaper for developing countries to use plant extracts instead of pure active principles because the cost of isolating such principles is high.

Prescriptions in developed countries contain over 180 active plant principles. About 45% of them are used as pure principles and the rest are used as crude drugs or crude extracts. Generally to date developing countries have exported only crude extracts from medicinal plants which are thereafter processed in developed countries to obtain pure (or crude) drugs with an added value about 10 times higher than the price of crude extracts.

Financial and infrastructure limitations did not enable developing countries to carry out chemical research and to develop adequate process technologies to extract the active plant principles used in bulk drugs and intermediates. The technology to extract active plant principles is generally available in developed countries whilst most plant raw materials obtained in developing countries require the transfer of the relevant technology according to the degree of uniqueness of each plant species, the assurance of a continuous supply of medicinal plants, and the identification of the local flora. Since a number of medicinal plants grow in developing countries either wild or with relatively low crop yields, there is a need to improve their crops and active principles yields to ensure the continuous supply in quantity and quality of the plant raw materials needed by the pharmaceutical industry.

Some countries are using extensively medicinal plant drugs and plant extracts (China, Mexico, Viet-Nam, Honduras, India, etc.). However there

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(1) First Consultation Meeting on the Pharmaceutical Industry, Estoril (Portugal). December 1980. UNIDO Publications ID/WG-331/1/6/8/10.

is still a need in developing countries to compliment expensive chemical drugs with cheaper plant-based drugs and to increase their supply of plant raw materials in upgraded form ranging from crude extracts to pure active principles. Since medicinal plant derived drugs in various forms of refinement are being used, and the economic need to increase its use combined with and as a complement to synthetic drug therapeutics has been recognized by the developing countries and international organizations (First Consultation Meeting (1)), it can be concluded that new industrial installations to extract and isolate the active principles will be required to assure reliable sources of supply of raw materials (medicinal plants) for these installations. The rationalization and improvement of cultivating procedures will also be necessary. Due to the diversity of climatic conditions and floras in the group of developing countries, evaluation of floras and research to find out the possibility to diversify cultures will also be required. As most of the technology available to obtain and isolate the active principle may be found in developed countries, it will have to be passed on to developing countries and adapted to the specific needs and circumstances of these countries. In many instances the technology for extraction, purification, formulation, storage and handling methods, will have to be developed based on the characteristics of certain plant species. It has to be recognized therefore, that collaboration among developing countries themselves and with international organizations such as UNIDO, WHO, FAO, etc. will be essential and that technical research and economical viability studies will have to be extensively carried out prior to the implementation of any industrial project. This situation shows the existence of an important potential market for any institution that could give composite services covering all the above needs, and coordinates all efforts, and justifies the need and existence of such institution. The ITPT Centre could cover this scenario, and as requested in the Terms of Reference, point 3.3., its conception and design have been done to cope for all of this.

F. Developing countries grouping. Evolution of pharmaceutical industry status.

At national level the group of Developing Countries have been divided by UNIDO into five broad groups (Second Panel Meeting of Industrial Experts on the Pharmaceutical Industries, Vienna, February/March 1978 (2)).

Group I Countries that have no manufacturing facilities and therefore are dependent on imported pharmaceuticals in their finished form; countries with limited public health services and poor distribution channels.

Group II Countries that are already repackaging formulated drugs and are making simple formulations.

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(1) UNIDO Publications ID/WG-331/1/6/8/10

(2) UNIDO Publications ID/WG-267/1/2/3/4/5.

- Group III Countries that formulate a broad range of bulk drugs into dosage forms and that are starting production of simple bulk drugs from intermediates.
- Group IV Countries that produce a broad range of bulk drugs from intermediates and that manufacture some intermediates using local raw materials.
- Group V Countries that manufacture the intermediates required for the pharmaceutical industry and that produce the plant equipment required. They also undertake local research in order to develop new products and to improve manufacturing processes.

Therefore, there will be an evolution in the status of the pharmaceutical industry in developing countries and a multipurpose centre will be needed to fulfill the demands for assistance from these countries. The IPT Centre could be this centre.

G. The patent situation

The impact of patent regulations on the pharmaceutical industry and on the objectives and activities of the IPT Centre has to be considered, in particular with regard to the transfer of technology (TOT). In this connection, an appropriate evaluation of the pros and cons of the patent system should be premised on two basic considerations:

- First: The recognition that patent protection, its scope and extent, are a matter of national sovereignty and should be viewed in the context of pertinent national policies and legislation.
- Second: The evaluation cannot be undertaken in abstract terms; the historical, economical and social conditions existing in the countries considered; the concentration of production and innovation in a group of developed countries and the predominant position of transnational enterprises in the world market, and the urgent need of developing countries to improve their health care and to set up an adequate infrastructure for the pharmaceutical industry, have to be considered.

Available evidence indicates that a great majority of patents in pharmaceuticals registered in developing countries belong to foreign enterprises which do not exploit them in the country of registration, but use them as a cover for export from the country of the patentee. In this context patents would merely serve to dissuade potential competitors from importing to the country concerned. The developing country point of view seems to be that as far as patents ensure a monopolistic market position, they make it unnecessary for the patent owners to undertake direct investments to gain and maintain their position in the market. In contrast the absence of direct or indirect protection of products is said to have allowed local firms to undertake activities of adaptation and technological development which in turn permitted them to obtain a market share and initiate the production of drugs without relying on foreign licenses.

The importance and advantages of patents as a means of promotion of the Transfer of Technology (TOT) to developing countries is under constant discussion. While patents granted in developing countries did not seem to have stimulated local manufacturing of drugs, they might have served as a means to block the potential transfer of technology, and to allow the patent owner to impose heavy restrictive practice in license agreements, to charge excessive prices and to control more or less the local industries. These practices hinder the development of local industry and limit the choice of alternative sources of technologies and materials.

The analysis of legislative trends in developed and developing countries indicates that the question of patentability of pharmaceutical products has not been historically dealt with as an abstract issue independent from the concrete economical and technological conditions under which that industry operates. Many developing countries have decided in recent years to eliminate or limit patent protection for pharmaceuticals. Some developed countries (Canada, Austria, Denmark, Holland) maintain exclusion of patentability of products. The patent status, registration procedures for drugs, and the legal approach of developing countries to the patents is different for most of them. Pharmacopoeias are also different. In European countries pharmacopoeias and policies are essentially the same, and that is why pharmaceutical industry moves ahead while in developing countries it does not. Therefore, the approaches of developing countries must be harmonized to obtain a collective approach to be successful. In Volume II, a review of the various patent status can be seen. To summarize, in view of the above considerations, the possible global impact of different patent policies does not seem to be beneficial to a sound and well balanced development of a pharmaceutical industry in developing countries. While patent protection seems not to promote either foreign investment or local inventiveness, the absence thereof could stimulate domestic adaptation and improvement of technology and a gradual increase of local manufacturing of bulk drugs. Anyhow, it is possible to state that only drugs whose patents have expired would be suitable for production in developing countries.

From the above it can be concluded that a need for information, legal and advisory services, (and therefore a market), exists and it is justified that the ITPT Centre, provides these services.

However, it should be stated that the activities of the ITPT Centre should accept, respect and comply with the patent regulations and policies of the Host Country and of the developing countries concerned, as well as the international agreements that may be reached in the negotiation and establishment of the International Code of Conduct on Transfer of Technology within United Nations Commission on Trade and Development (UNCTAD).

If, as result of the services of the Centre, a product or technology appears suitable to be patented, the rights of use could be passed on to the country that requested the service or to the group of developing countries. This

subject should be agreed by the Centre member governments to avoid any local discrepancy with the Host Country and member country regulations and to be consistent with the statement of the former paragraph, also the agreement reached should be stated in the Institutional Agreement.

#### H. Harmonization of policies

There are urgent needs for developing countries to reach an acceptable health level, and to do so their governments should establish policies aimed at rationalizing and accelerating the growth of their pharmaceutical industries.

Three actions may be taken to rationalize brandnamed drugs on the market.

1. Firstly the elimination of "duplicative" drugs for which adequate therapy exists on the market.
2. Secondly, the elimination of "ineffective" drugs, along the lines of activities of the United States FDA and the Swedish Drug Control Authority. This would get rid of a large number of irrational combinations and drugs of unproven efficiency.
3. Thirdly, the elimination of drugs for which the toxic effects are unacceptably high and whose use needs to be more limited.

The criteria suggested by the World Health Organization WHO (1) for the preparation of a list of priority pharmaceutical drugs for each country allocates different priorities to different kinds of drugs, based on therapeutical needs, effectiveness and cost. All drugs contained in the list would be provided within the country but they should be grouped into three categories according to priority:

First line drugs would be the main drugs needed for primary health care, relevant to the diseases of wide prevalence and for preventive care. Such drugs would amount to 50 to 60 and would cover 80 to 90 percent of the total health needs.

Second line drugs would be available at district or regional hospitals and would be needed for cases that have not responded to first-line drugs or are so severe that second line drugs should be used immediately.

Third line drugs would be available only for specialized tertiary care.

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1) WHO, "The Selection of Essential Drugs", Technical Report series n° 615 (Geneve, 1977), and WHO, "The use of Essential Drugs", Technical Report series n° 685 (Geneve, 1983).

The first-line drugs are considered as basic drugs, while all the drugs together may be called "rationalized list of drugs".

The basic list is defined by the prevalence of illness, therapeutic effectiveness, available resources and cost. Normally the list will not correspond to the pattern of domestic production of drugs. However many of the basic drugs are fairly standard and unpatented and the technology for these products already exists in the developing world.

For selecting basic drugs of each national list suitable for local manufacture, UNIDO agreed in the Second Panel Meeting on Pharmaceutical Industry, in Vienna, (1) the following criteria:

- a). The drug is widely used and/or required by the health authorities to treat diseases prevalent in the country.
- b). Its efficiency and safety in the treatment of diseases has been demonstrated and WHO has endorsed its use.
- c). The cost per treatment is low enough for the population to afford.
- d). There are other special advantages of local manufacture as opposed to imports (cost of transport, stability during transport, availability of raw materials, saving of foreign exchange, etc.).
- e). The feasibility study of the project indicates that economic production could be ultimately attained, including the meeting of regional and interregional demands.
- f). The manufacturing process is appropriate to the conditions prevailing in the country.
- g). The know-how for manufacture is available for production, whether patented or not.

In connection with the patent situation described in Article 1-4-G and the above conclusions and in view of the actual trends reported for marketing "generic drugs" (i.e. compounds and extracts sold without a brand name, therefore with a lower production and sales cost than branded drugs) which are normally unpatented or patent expired substances, the ITPT Centre could provide significant services to developing countries in the selection of the most convenient of such drugs, either for their purchase or for their manufacture in a second stage, reducing the health care cost and saving foreign exchange. Most of these "generic drugs" fall within the group of aged products, and it is reported that they share a higher percentage of sales than new ones (New Chemical Entities-NCE) due to longer approval periods required and increased cost of research for the latter. Therefore, this production is of highest interest in developing countries for public and private enterprises.

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(1) UNIDO Publications ID/WG-267/1/2/3/4/5

It has been reported that in the United States, (1) the cost to develop a NCE was 69,8 Million US\$ in 1979; of these 15 to 20 Million US\$ were due to regulatory approval. Reports also show that 25 months were required, as an average, in 1950 for approval; 67 months in 1970 and 100 to 150 months in 1980. Therefore it is not advisable that the ITPT approaches the development of NCE's.

The policy for selection of products to be formulated in those countries with an incipient pharmaceutical industry should also follow the guidelines stated in the Second Panel Meeting in Vienna, (2) and are the following:

- 1). Bulk drugs should be formulated in dosage forms such as tablets, capsules, ointments, liquid preparations, solutions, etc.
- 2). The medical need should be established by studies on prevalent diseases and be sufficient to justify a relatively large volume of production.
- 3). In the first phase, pharmaceutical products should be technically easy to produce and the products should have a reasonable wide therapeutic range.
- 4). In the second phase, more difficult products and those of narrower therapeutic range should be considered.
- 5). All products should have a good stability, particularly in hot and tropical climates.

The policy for the selection and transfer of technologies and know-how to developing countries should consider the six methods agreed in the Second Panel Meeting in Vienna (2) as well as terms and conditions agreed therein. The methods proposed are:

- 1). Establishment of subsidiaries by foreign companies.
- 2). Joint ventures.
- 3). Transfer of Technologies (TOT) under license with or without royalties.
- 4). Outright sale of technology.
- 5). Cooperation between developing countries.
- 6). Through United Nations and other international organizations.

The terms and conditions for T.O.T. were suggested by UNIDO, modified and agreed by the Panel and can be found in the official reports of the Panel Meeting. (2)

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- 1). B.G. James, "The marketing of Generic Drugs", A.B. P., London 1981 (1982 reprinted), Chapter 2.
  - 2). UNIDO Publication ID/WG-267/1/2/3/4/5



However, it is interesting to highlight the need that personnel of the developing countries should be trained to manage and to operate the production facilities and to undertake product information, distribution, research and development activities, and that the technology should be adapted to suit local conditions.

It becomes obvious, therefore, the existence of a demand for assistance in the development and application of harmonized policies for the development of the pharmaceutical industry, and for a training programme for pharmaceutical personnel, and it can be stated that the role of the ITPT Centre in this regard is significant.

#### J. Technical Cooperation among Developing Countries (TCDC)

There is no uniform pattern of integration of the pharmaceutical industry in most of the developing countries, the final stage of which is the formulation of the finished products, the middle phase of which is the production of semi-finished products and the initial phase the production of drugs in bulk, whether obtained by synthesis or by extraction from natural sources.

The three stages exist in the group of developing countries, but there are marked differences between countries, as pointed out in the classification done by UNIDO into five groups, which has been mentioned in paragraph (I-4-F). The Centre should not ignore these differences but make provisions for special aid to all countries in search of advice and solutions to their problems.

However, emphasis must be placed on the technical cooperation of various countries in order to obtain a market which justifies the economic operation of a plant. Cooperation may take various forms and interchange sought which does not lead to problems regarding the balance of payments. The ITPT should provide or coordinate these activities, advising the most appropriate products to be fabricated, the suitable technology to be used and conducting the corresponding feasibility studies.

#### I-5 GENERAL CONCLUSIONS

From the above considerations it is concluded that a market exists for a wide range of services in response to an existing demand for applied technology research, training, information, transfer of technology, and advisory services (financial studies, harmonization of policies, development, engineering, etc.).

The characteristics of this market (one of them is the wide variety of needs) justifies that the Centre be a multipurpose one, in the sense that it should cover a wide range of different services.

Because many countries could become members of the Centre and make use of its services, it is concluded that the Centre should have an International Status.

With this conceptual definition the proposed International Centre for Information, Training and Development of Pharmaceutical Technology could provide valuable services to developing countries in acquiring technologies for their pharmaceutical sector, adapt manufacturing processes to fit their specific needs and provide quality control for drugs, intermediates and raw materials, either imported or manufactured by them.

Another important sector which this Centre could help to develop is a medicinal plant industry and to evaluate their flora, which would play a vital role in the health care of poor people at minimum cost.

For each of the above, and as mentioned before, information and training for the human resources of developing countries are inherent needs that the centre could fulfill.

#### I-6 OBJECTIVES OF THE CENTRE

In response to point 2 of the Terms of Reference and as a result of the General and Special Considerations which highlight the need of an institution conceived like this proposed ITPT Centre, and the existence of a market where to sell its services, the objectives of the Centre can be defined. These objectives are also consistent with the U.N. Lima Declaration and plan of Action on Industrial Development and Co-operation (Lima, Perú; March 1975), with the Declaration of the International Conference on Primary Health Care (Alma-Ata, U.S.S.R.; Sept. 1978), with the Second Panel Meeting of Industrial Experts on the Pharmaceutical Industry (Vienna, Austria; February/March 1978) and with the conclusions and recommendations on the First Consultation Meeting on the Pharmaceutical Industry, (Estoril, Portugal; April 1980).

##### A. Overall Objective

To back-up the developing countries in responding to their needs in health care where a potential exists for a national supply system of pharmaceuticals.

##### B. Specific Objectives

1. To develop technological capability to meet the pharmaceutical needs of developing countries.
2. To furnish information to strengthen the position of developing countries in establishing and developing their pharmaceutical industry.
3. To identify and develop human resources required by the pharmaceutical industry.
4. To develop national pharmaceutical production to support and improve the economics of health in developing countries.

5. To foster Economical Cooperation among Developing Countries (ECDC), for pooling the intellectual resources, market potential, raw materials, investment and harmonization of policies towards establishing viable pharmaceutical industries in order to make an impact aimed to meet the health needs of developing countries.

#### I-7 ACTIVITIES PERFORMED BY THE CONSULTANT

The activities performed by Foster Wheeler Iberia, S.A. respond to the requirements outlined in point 3 and Annex A of the Terms of Reference in order to see if this study can assist the developing countries to improve their economics of health. Therefore, such activities have been aimed towards:

1. Identifying the technical assistance needs of developing countries to develop and or implement their pharmaceutical industry.
2. Identifying the potential market that these needs represent.
3. Establishing the concept of a Centre that could fulfill these requirements, and whether the existence of such Centre is required and justified or not.

If the results of the above mentioned activities show that the Centre existence is justified and required, and based on the concept developed for it:

4. Propose the activities and programme for the Centre.
5. Analyze and propose the Institutional Status and Charter of the Centre.
6. Define the facilities for the Centre, the equipment required and the necessary staff.
7. Define a proposed timetable for the establishment of the Centre.
8. Estimate the investment cost to build the facilities, and the annual operating costs.
9. Estimate the annual revenues that the Centre can obtain.
10. Analyze the financial viability of the Centre.

#### A. Brief description of the activities performed by Foster Wheeler

To fulfil the specific requirement of points 1, 2 & 3 above, Foster Wheeler Iberia has done the following:

1. Foster Wheeler Iberia has done research of available literature published by the following, among others:

UNIDO (United Nations Industrial Development Organization).  
WHO (World Health Organization).  
IMS (International Medical Statistics)  
IBRD International Bank for Reconstruction and Development  
Bank - World Bank).  
SRI (Stanford Research Institute)  
IRC (Information Research Limited)  
IPB (International Pharmaceutical Bulletin)  
IPN (International Pharmaceutical News)  
SCRIPT and other periodical publications.  
Foster Wheeler Data bank.

2. Also, Foster Wheeler Iberia prepared and issued a questionnaire to ninety-nine developing countries to obtain updated information on their pharmaceutical industry and the degree of interest that such countries have in the establishment of this Centre and in the utilization of the Centre's services, in order to develop an "interest factor" to assist in sustaining the size of the market and an estimate of the Centre's revenues.

A copy of the questionnaire issued is attached as Annex II-1 to Volume II of this study.

The amount of countries that have answered the questionnaire so far have been insufficient to draw a conclusion. Only seven countries out of ninety-nine answered and six of the answers received provided some data on the actual status of the pharmaceutical industry in the corresponding country, whereas one of the answers stated that they had no data available and suggested that UNIDO send a mission to investigate the situation.

It is obvious that once the various governments have in their possession all of the pertinent information about this subject possession the interest and participation of each government will have to be confirmed at an intergovernmental meeting.

3. Finally visits have been paid by Foster Wheeler Iberia, S.A. to ten countries for the same purpose. The list of countries visited is given in Chapter III, "Counterparts", of Volume I.

As a result of this situation, the revenue values utilized to perform the financial viability analysis have been estimated based in the data available, without being corrected to take into account the above mentioned "interest factor". A detailed description of the methodology followed to arrive at this estimate, based on accepted statistics and sources, is given in Volume II, together with a set of graphics named "methodology diagrams" and the statistics used.

In view of the above and of the results of the financial calculations, whose summary is given in Article I-13 of this Volume I, it is concluded, and recommended, that the Centre programme must be flexible, and checked with the countries interested in the Centre before implementation, so that these countries can revise it to make it more suitable to their needs or to indicate if they want to modify the design and rearrange it in a different way. Several alternatives for the Centre's facilities are given in this report. It is interesting to note that the initial investment cost would not vary very much with such changes within each alternative, but the total investment for the three partial centres as compared with a single one will be much higher. However, to study the definitive financial viability of the Centre, it is required that in addition to the above agreement, the countries interested in becoming members commit themselves to participate and to the degree of participation, so that the economic calculations can be put then on a fixed basis, and therefore the results of the evaluation become definitive and sustained by a "committed market" prior to being presented to banking or financial institutions, in case loans are required.

To fulfil the requirements of points 4 thru 10 mentioned on page I-21 the following visits were made by Foster Wheeler Iberia:

At the beginning of the work, (April 1983) Messrs. Fdez. Benlloch and Grunberg of Foster Wheeler Iberia, S.A. visited Dr. Tcheknavorian and Messrs. Majid, Wijesekera, Chari and Ms. Ma. Quintero de Herglotz at UNIDO Vienna for an exchange of views and data collection.

In May, Mr. Fdez. Benlloch visited Lisbon and met with Mr. L.D. Canelas of the Ministry of Industry of Portugal.

In May and June, Messrs. Sommer, Fdez. Benlloch and Professor Nascimento met in Lisbon with Mr. L.D. Canelas, Prof. Romero, Mrs. Ines Florencio, and Mr. Sergio Spadas of the Ministry of Industry of Portugal.

In June, Messrs. Sommer, Fdez. Benlloch and Professor Nascimento met in Lisbon With Mr. L.D. Canelas, Prof. Romero, Mrs. Ines Florencio, and Mr. Sergio Spadas of the Ministry of Industry of Portugal.

In July, Messrs. Sommer and Fdez. Benlloch met in Vienna with Mrs. A. Tcheknavorian and Messrs. Majid, Newman and Angulo to present and discuss the Interim Report. Messrs. L.D. Canelas and S. Spadas and Ms. Ines Florencio of the Ministry of Industry of Portugal also joined this meeting.

In August, Mr. E.W. Sommer visited Mr. D. Caplan of the World Bank, in Washington, D.C.

In September Messres. E.W. Sommer and J.F. Benlloch visited UNIDO's headquarters in Vienna to present and discuss the Draft Final Report with Dr. A. Tcheknavorian and Mr. Majid.

Based on the data collected, the various experts of the consultant's team concentrated on defining, estimating and analyzing the ITPT Centre utilizing the resources available in Foster Wheeler Iberia S.A's main offices. In the following paragraphs the result of this work is summarized.

#### I-8 CONCLUSIONS OF THE MARKET SURVEY

The conclusions and the proposed Plan of Action in Article I-14 are based on the following premises:

1. That many universities exist in the area where the Centre will be located, offering courses related to research, development and production of synthetic drugs. Also that some centres teach courses related to the cultivation and technology of extraction of medicinal plants and derived drugs.
2. That there are no research groups working specifically on topics relating to these drugs, although some are at least carrying out studies based on similar scientific process.
3. That national industries devote part of their technical resources to maintain the productivity of processes, but in practice do not carry out improvements.
4. That multinational industries generally have their research centres outside the developing countries. From the age of the plants and absence of any changes in the instrumentation and equipment, it may be inferred that the technology in these countries is not being significantly improved on an ongoing and planned basis.
5. That the Host Country in which the Centre is located ensures that experts from other countries should be employed, and that technology and other information would be transferred to the other member countries.
6. That the Host Country demonstrates the willingness to contribute to the financing of part of the investment and running costs.
7. That the Centre's plan of action be in the form of a programme which conforms with current priorities but which is sufficiently flexible to allow for future alternatives and expansion.
8. That other areas of activity not directly related with the basic plan, must not be overlooked by the Centre, such as:

- Consulting and Advisory Services.
  - Feasibility Studies.
  - Projects Supervision.
  - Preparation of Manufacturing Standards.
9. That the Centre be allowed to have independence and flexibility to request outside consultant services to solve specific problems.

The following conclusions have been drawn from the former General and Special Considerations, the premises stated above, the results of the Centre market survey and financial analysis. (This is a summarized response to point 3 of the Terms of Reference).

- A. The health care needs of the developing countries constitute a market which, even considered over the short term for the most common drugs (UNIDO and WHO recommended essential drugs (1) (2)) of synthetic origin and widely or popular accepted medicinal plant drugs can be defined as significant. If other less widely used drugs are added, the figure for projected drug requirements is even greater.
- B. The demand for pharmaceuticals is affected by several factors, the most important being the size of population and the incidence of disease in any particular region. The increase in drug requirements is related to the increase in population, which in developing countries is the rate of developed countries. The positive change in the rather poor status of health care facilities is another reason to increase drug consumption demand. This is illustrated in Volume II, chapter I, which provides quantitative data and projections.
- C. Most developing countries with production facilities produce a proliferation of brand-named drugs with several thousand variations of a basic number of 700 to 1000 drugs which are actually used. A country wanting to reach or keep the therapeutic benefits provided by the existing array of drugs could do it with some 500 to 600 pharmaceuticals. This is roughly the number of drugs used by the most advanced hospitals in developed countries. Poor nations may well decide to do it with a smaller number of pharmaceuticals. About 200 separate drugs are considered to be the minimum necessary to convey some degree of self-sufficiency and to provide basic protection against illness.
- D. The developing countries cannot afford the luxury of unplanned production of many different drugs for prevention of the same disease. Depending on the public health needs, disease problems and techno-economics of production, UNIDO has recommended that each country should draw up a

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(1) WHO, publication ISBN-92-4-154135-0

(2) UNIDO/Publications PC 33 and ID/WG-393/5, (1983).

priority list of essential drugs which are most commonly required. The Second Panel Meeting of Industrial Experts on the Pharmaceutical Industry (Vienna, February/March 1978) (1) agreed the criteria for selecting those drugs from each national list which would be profitable for local production. The Panel also agreed on the guidelines for the selection of products on which formulating activities could be concentrated in those countries where the pharmaceutical industry was just starting.

- E. Because of this significantly increasing demand (it is postulated a change of a share of almost 15% in world demand in 1980 to 29% in the year 2000) (2) and the present fact of limited production and formulating capacity in developing countries (see Table II-III-A/B and II-5 Volume II), it is believed that there is a considerable scope for the establishment of profitable new industrial operations in many countries in the medium to long term as a result of the big jump in the requirements for pharmaceuticals.
- F. To implement these industries in a feasible way, TOT contracts, technology development and application, engineering and financial studies, will be required to implement and run such industries and to improve the economics of health. Cooperation among developing countries, quality control assurance programmes and laboratories and permanent skilled consulting will also be required. Most of these actions must be taken now and all of them constitute a market for any institution which is prepared and capable to fulfil these demands. This will respond to the objectives set forth in Article I-6 for the ITPT Centre.
- G. From the above, it is concluded that a large potential market exists for the ITPT Centre in the assesment, transfer and adaptation of the proper technologies for manufacturing of the recommended essential or basic drugs, in the establishment and application or quality control procedures in developing countries and in the performance of the analysis and studies that will assure the successful implementation of the industrial projects. The existance of this potential market justifies the implementation of the ITPT Centre and backs-up its potential sales volume.

From these conclusions the proposed activities of the Centre have been outlined and stated in the next Article I-9 "Proposed activities of the ITPT Centre".

In Volume II, Chapter I, statistics and details of the Centre's potential market can be found. Volume III, Chapter II, Article II-1, summarizes the estimated revenues that the Centre could obtain from the sales of its services, either if these monies are obtained from fixed quotas from member countries (which in turn will obtain free the services of the Centre) or from sales to non-member countries. These services have been evaluated in consistency with the proposed activities. The unit sale prices

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(1) UNIDO Publications ID/WG-267/1/2/3/4/5

(2) "Opportunities for pharmaceuticals in the developing world over the next twenty years", IRL report London 1980.



of the Centre have been assumed to be about fifty (50) percent the current average market prices for equivalent services. Average market prices and sources are given in Volume II, Chapter I. Based in the proposed Plan of Action and scheduling for rendering services, the expected overall revenues would be as follows, taking into account the sales price inflation rate.

**TABLE I-1****SUMMARY OF EXPECTED OVERALL REVENUES (Note 1)**

Years after entering into operation	Income value in US \$ 1000 (current values)				ITPT capacity sold (% of rated capacity)
	Base Case	Alt 1	Alt 2	Alt 3	
1	4271	524	505	3226	50%
2	5774	708	683	4376	65%
3	7391	907	875	5601	80%
4	9128	1120	1080	6971	95%
5	9993	1226	1183	7572	100%
6	10,393	1275	1230	7875	100%
7	10,809	1326	1279	8190	100%
8	11,241	1379	1330	8518	100%
9	11,691	1434	1383	8859	100%
10	12,158	1492	1438	9213	100%

An illustrative estimate breakdown of services that could be rendered by the ITPT Centre, would be as follows, unless the Centre facilities and staff are expanded, using the space foreseen for this purpose:

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Note 1.- The definition of what is included in the base case and each alternative is indicated in paragraph I.10 of this Volume

**TABLE I-2**  
**ILLUSTRATIVE BREAKDOWN OF SERVICE**

Centre Services Unit	Number Of Services Rendered In Year Number After Entering In Operation				
	1	2	3	4	5 to 10
<u>Analytical Quality Control Unit</u>					
-Chemistry Lab. test	2.500	3.250	4.600	4.750	5.000
-Instrument Lab. test	2.800	2.250	2.700	3.300	4.000
-Microbiology Lab. test	4.000	5.250	6.300	6.800	8.000
-Pharmacology Lab. test	900	1.100	1.400	1.700	2.000
<u>Applied Research Unit</u>					
-Synthetic Drugs Pilot Plant and Laboratory	2	4	7	9	10
-Medicinal Plant Extracted Drugs Pilot Plant and Laboratory	1	3	4	6	6
-Formulation and Packaging Pilot Plant and Laboratory	25	30	38	45	50
-Packaging Pilot Plant and Laboratory (Production runs)	70	90	115	135	150
<u>Training Unit</u>					
-Quality Control	40	45	55	65	72
-Pilot Plant	90	130	170	200	216
-Engineering and Advisory	10	12	18	20	24
<u>Industrial Unit Projects</u>					
Engineering and Advisory Services	2	2	3	4	5

Note: 200 working days per year has been assumed

## I-9 PROPOSED ACTIVITIES AND PROGRAMME

In response to point 4 of the Term of Reference, as a result of the market survey and the General and Special Considerations and to achieve the objectives stated in Article I-6, the following activities are proposed for the ITPT Centre to develop. Further details and description of these activities are given in Volume II, Chapter II..

### A. ACTIVITIES

#### Group I

Process and applied technology research and development.

Initial activities will be aimed to apply existing technology to the specific needs of developing countries, either to commence production or to improve existing techniques. This could be done in the following areas:

1. Applied research on basic and generic drugs obtained by synthesis. Profitable drugs should be considered and not only essential drugs.
2. Applied research on extraction of drugs derived from medicinal plants. Profitable drugs could be sought and not only those strictly required to complement synthetic drugs therapy.
3. Formulation and packaging research for the above.
4. Scale-up tests.

#### Group II

Analytical and quality control testing.

#### Group III

Technical assistance services for management and administration staff, transfer of technologies, viability studies and engineering assistance of the develop or implement industrial projects, development and rationalization pharmaceutical industry. Within this group, complete and extensive information services on pharmaceutical industry related matters are included.

#### Group IV

Training services in plant operation, applied research, quality control, projects evaluation and plant management.

### B. PROGRAMME

The ITPT Programme can be outlined as follows, as a result of the qualitative market survey made before, and in response to point 3.4 of the Terms of Reference.

A. Synthetic Drugs Section

1. Carry out feasibility studies on synthetic drugs in order to establish the technical and economic factors to set up production facilities in developing countries.
2. Transfer technologies for the processes related to the production of synthetic drugs and carry out suitable studies to improve the existing processes taking into account the requirements and conditions of the individual country.
3. Carry out laboratory, pilot and semi-industrial scale processes to study the optimal operating conditions, equipment, raw materials and intermediates required in each particular case.
4. Standardize procedures and certify the quality of the products.
5. Train personnel to manage and operate industrial plants and to familiarize themselves in applied research, using the ITPT centre laboratory and semi-industrial scale pilot plants.
6. Exchange expertise.
7. Advise and assist in obtaining and providing information on pharmaceuticals and the pharmaceutical industry.

B. Medicinal Plant Derived Drugs Sector

1. Encourage and promote surveys of the potential of the flora of developing countries for their utilization as a source of plant derived pharmaceuticals.
2. Carry out feasibility studies for developing countries to see if it is feasible both technically and economically to set up production facilities for medicinal plants.
3. Assist in the transfer of technologies for the systematic cultivation of selected medicinal plant, and promote and develop new technologies or improve the existing ones, to tailor them to an individual country's conditions.
4. Carry out laboratory and pilot plant scale-ups and applied research for extraction processes, formulation and packaging of medicinal plant derived drugs, giving priority attention to those mentioned in Table II-X whose production in developing countries appears to be of immediate advantage.
5. Standardize and certify the quality of the products.
6. Train personnel and exchange expertise.

D. Quality Control Sector

1. Standardize quality control procedures.
2. Provide quality control services for bulk drugs, intermediates, raw materials and finished forms on and industrial basis. This programme is not intended to investigate new drugs (NCE).
3. Train personnel and exchange expertise.

E. Training Sector

The programme for training activities would cover all sectors of activities of the I.T.P.T. Centre and would be carried on at the same time. It has been highlighted in paragraphs A (point 5), B (point 6), C (point 6) and D (point 3) above. The proposed duration of each training course has also been specified in Chapter II, Article III - of Volume III.

F. Engineering and Advisory Sector

The programme of activities in this sector should be extremely flexible due to variety of problems that may arise. It will range from feasibility studies to project execution; from standardization of procedures to harmonization of policies; from assistance in negotiations for transfer of technology to management of contracts on behalf of developing countries. All the experts and departments of the I.T.P.T. Centre may be involved in most of these services in many instances. Therefore it has been preferred to highlight the most relevant points of these programmes within the programme outlined for the other sectors. To summarize, points 1,2,4,6 and 7 of paragraph 1-4-A, points 1,2,3,5 and 6 of paragraph 1-4-B, points 1, 3, and 6 of paragraph 1-4-C and points 1 and 3 of paragraph 1-4-D above, indicate specific activities of the Engineering and Advisory group.

G. Information Sector

The I.T.P.T. information sector would provide information on the pharmaceutical industry all over the world, drugs prices and market trends, new products and technologies, sources of products, techniques equipment and information. It should collect and inform of the results of the I.T.P.T. Centre operation and achievements. Its computerize library should be connected to the international system of information. Books and periodical publications should be obtained and extracted to offer to member countries a quick source of information on all subjects related with the pharmaceutical industry.

I.10 CENTRE DEFINITION AND IMPLEMENTATION ALTERNATIVES

This Article responds to point 4 of the Terms of References.

The ITPT Centre facilities have been designed in accordance with the concept

and activities defined before, and have been adjusted to the overall dimensions of the land plot offered by the Portuguese Government. Depending upon the final location of the ITPT Centre, this design could be modified. Four alternatives have been considered to allow for the installation, in different countries, of the various sections of the ITPT Centre, if so preferred by the developing countries, or of one single multipurpose centre in one host country. Each alternative can be implemented in one stage or in sequential form.

The alternatives are as follows:

- o Base case: One single building with all services integrated
- o Alternate 1 Synthetic drugs pilot plant facilities
- o Alternate 2 Medicinal plant derived drugs pilot plant facilities
- o Alternate 3 Quality control, Formulation and Packaging, Information and Advisory Services facilities.

Details for the Centre facilities, organization and staff are given in Volume II, Chapter III of this study. A summary follows of the various proposed alternatives:

A. Base Case: One Multipurpose Centre Integrated in One Single Building

The Centre facilities will consist of one single building with two below ground levels (basements) a ground floor and first, second and third floor.

The second level below ground will be used for parking, service machinery and workshop.

The level below ground will house the formulating and packaging pilot plants, associated laboratories and sterile areas, quarantine, finished product storage and utilities house.

The ground floor level will house the administration area, manager's offices, computer rooms, and medical centre.

The first floor level will house the analytical and quality control laboratories, engineering and advisory services unit, and animal breeding facilities.

The second floor level will house the library, information services area, and the auditorium. From this level and up, one end of the building is exclusively dedicated to the semi-industrial pilot plants, duly separated from the rest of the building by double concrete walls and a isolation area for security reasons.

The third floor level will house the green house, cafeteria and kitchen, and will have room for future expansion, as well as for the expansion of the pilot plants.

The dimensions of the building would be:

- overall length 48 meters
- overall width: 23 meters
- overall height (above ground level) 12 meters

The total constructed area would amount to about 6,000 square meters.

A detailed graphical description of the building and its internal layout has been included in Volume II, Chapter III, Exhibit II-2, "Descriptive Drawings".

A detailed equipment and apparatus list has also been included in Volume II, Chapter III, Articles III-3 and III-4.

**B. Alternate 1: Synthetic Drugs Pilot Plant Facilities**

For this alternate the centre will consist of building with one level below ground and a ground floor, first floor and second floor.

The first floor will house the pilot plant supporting laboratories, library, training rooms and medical centre.

The second floor will house the management and administration offices and will cover only fifty per cent of the building area.

The basement will be dedicated to parking and to a utility facilities room.

The building will be "T" shaped and its overall dimensions would be:

- overall length: 62 meters
- overall width: 45 meters
- overall height (above ground level) 9 meters

The total constructed area would amount to about 4,100 square meters.

**C. Alternate 2: Medicinal Plant Derived Drugs Pilot Plant Facilities**

The organization and shape of the building would be similar to that of Alternate 1, except in that the pilot plant would be dedicated to medicinal plant active substances extraction, and the rear part of the second floor would house the green house and dryers, in addition to the management and administrative offices. The dimensions would also be different, and would be as follows:

- overall length: 53 meters
- overall width: 35 meters
- overall height (above ground level) 9 meters

The total constructed area would amount to about 3,400 square meters.

D. Alternate 3: Quality Control, Formulation and Packaging Pilot Plant, Information and Advisory Services Facilities

The organization and shape of the building would be similar to that in Alternative 1, except for the rear part of the first floor which would be dedicated to the quality control unit laboratories. In this alternative the dimensions would be as follows:

- overall length: 57 meters
- overall width: 41 meters
- overall height (above ground level) 9 meters

Total constructed area would amount about 4,000 square meters.

The required staff and organization to operate this facility is described in detail in Volume II, Chapter III, Article III-1 for each implementation solution. The resulting overall staff is as follows:

Base Case	124 people
Alternate 1	52 people
Alternate 2	52 people
Alternate 3	91 people

I.11 LOCATION CRITERIA

Foster Wheeler Iberia, S.A. has concluded that the country and area where the International Centre for Information, Training and Development of Pharmaceutical Technology (ITPT) is to be located, must be one that meets most of the following criteria:

- 1) It has a basic pharmaceutical industry covering both types of drugs mentioned in this report, and has a real interest in contributing to the Centre and collaborating in its activities.
- 2) The current level of activities in such drugs, of the country in which the ITPT is located is sufficiently high to be able to supplement the Centre's services.
- 3) No immigration limitations exist preventing entry into the country of nationals from member countries to work at or visit the Centre, or exclude any advisors which the Centre may require.
- 4) Acquisition of maintenance services, spare parts, sales of accessories and other aspects following the setting up of the Centre should offer no difficulty.
- 5) There should be political and economic stability and neutrality, so there are no problems in regard to other countries.



- 6). Industrialists, members of the government and the academic field should have knowledge and experience in the production of synthetic drugs, medicinal plant extracted drugs and in medicinal plants cultivation.
- 7). It should have given its official decision to provide economic and financial backing to defray some of the Centre's running costs and initial investment requirements.
- 8). The Centre should be located close to existing Research Centres, Universities and Industrial areas to facilitate coordination mutual assistance and interchange of knowledge.

The above conclusions are only valid if the following are applicable:

- 1). That the country where the Centre is located is able to place group objectives above its own interests.
- 2). That it acknowledges and observes the special and regional nature of scientific and economic programmes and the rational use of human resources.
- 3). That it explicitly acknowledges the Centre as an internationally recognized legal body.
- 4). That the Centre be both legally and economically independent of any national organization.
- 5). That the Host Country offers financial contributions such as land, building and qualified local personnel expenses.

It has been confirmed after a through analysis of the factors listed above, that Portugal could be one of the countries who fulfils the greatest number of criteria. The specific proposed location by Portugal, at the LNETI grounds at Lumiar, is most appropriate, with the additional advantages of excellent international communications facilities, available housing in the surroundings and its being a part of an industrial and research area with all basic utility services already installed. However, if required, other countries could be explored.

#### I-12 INSTITUTIONAL STATUS OF THE CENTRE

This responds to point 5 of the Terms of Reference.

In establishing the ITPT Centre the participating governments will have to agree and subscribe to an instrument forming the legal base for its structure and operation.

Taking into account the initiative of the Secretariat of UNIDO, its contribution to the preparatory work for the establishment of the Centre and the role it would play in furthering the aims and objectives of the ITPT Centre, the head of UNIDO or his representative could be an "ex-officio" member of the Board, regardless of the final Institutional Status accepted for the Centre.

Several considerations have been made prior to analyzing the various possible alternatives for the Institutional Status. Such considerations are discussed in detail in Volume III, Chapter I, of this study, and can be summarized as follows:

1. The assistencial character of the Center to developing countries, who must participate on a basis of equality.
2. The convenience of the creation of the Centre by as international agreement with a international status.
3. The characteristics of the Centre that the International Status should consider, such as:
  - Juridical personality
  - Headquarters' seat and property
  - Immunities and privileges in respect to individuals
4. The independence ad autonomy of the Centre from any country for its implementation and functions.

Bearing in mind the above, three possibilities have been analyzed for the Institutional Status of the ITPT Centre. However, the final decision must be made by the member governments. The possibilities are:

- |                  |  |
|------------------|--|
| Possibility nº 1 | To establish the ITPT Centre as an independent International Body under multilateral convention ratified by the interested governments.  |
| Possibility nº 2 | To establish the ITPT Centre as a subsidiary of UNIDO/UNITED NATIONS.  |
| Possibility nº 3 | To establish the ITPT Centre under the auspices of the Host Country as an Institution linked to UNIDO for cooperation, or as a Foundation with other governements contributing towards it. |

*The advantages and disadvantages pf each possibility are discussed in detail in Volume III, Chapter I, Article I-3 of this study. Summarizing this discussion it can be said that the main advantages of possibility nº 1 (Independent International Body) is the direct involvement of member countries in running the Centre and in using their services, therefore, ensuring its continous operation since they are getting directly the benefits of the ITPT Centre. The main disadvantages is the possibility of different opinions between member governments which could create difficulties in difficult the operation of the Centre.*

Possibility nº 2 (Subsidiary of UNIDO/UN) has the advantage in the qualification of UNIDO/UN to assure the successful running and to obtain collaboration among member governments. The main disadvantages are the legal procedures to establish it as a UNIDO Centre if financial commitments have to be taken by UNIDO.

Possibility nº 3 (Institution or Foundation auspiced by the Host Country) has the advantage of easy establishment because of procedures, however it could generate lack of confidence on the part of developing countries.

Therefore, only possibilities nº 1 and 2 are emphasized. Further on, Article I-4, in Volume III, Chapter I, outlines several suggested aspects that could be considered in the Implementation Agreement of the Centre.

It is recommended that this be discussed between the countries interested in order to select the most convenient possibility for them.

### I-13 SUMMARY OF INVESTMENT COSTS AND OPERATING COSTS. RESULTS OF THE FINANCIAL EVALUATION. FINANCIAL SOURCES

The results of the economic study are summarized below.

The definition of the Base Case and each Alternate definition has been stated in article I-10 and a summary of the Centre's estimated revenues has been given in Table I-1, Article I-8.

A. A Summary of the Investment Costs is as follows:

**TABLE I-3**

Summary of Investment Costs

(Values in million of U.S. dollars)

Base Case A	12.4
Base Case B	3.7
Alternate 1	7.9
Alternate 2	6.4
Alternate 3	7.9

Notes:

- 1.- Working capital requirements are not included.
- 2.- All these values have been calculated taking into account the inflation rates applicable and the percentage of the Centre's capacity in operation each year, utilizing the most likely values for all variables.
- 3.- All figures have been rounded off to the first decimal.
- 4.- Base Case B is the same as Base Case A, but with 70% of the investment cost donated.

B. A summary of the Operating Costs is as follows:**TABLE I-4**Summary of Operating Costs

(Values in millions U.S. dollars)

Years after entering into operation	1	2	3	4	5	6	7	8	9	10
Base Case A	7.7	6.6	7.2	7.9	8.3	8.5	8.8	9.0	9.3	9.6
Base Case B	4.9	4.9	5.6	6.3	6.7	6.9	7.2	7.5	7.8	8.2
Alternate 1	4.3	3.5	3.8	4.1	4.3	4.4	4.5	4.6	4.8	4.9
Alternate 2	3.7	3.0	3.3	3.6	3.8	3.9	4.0	4.1	4.2	4.3
Alternate 3	5.4	4.7	5.2	5.8	6.1	6.3	6.5	6.7	6.9	7.1

C. A summary of the results of the Financial Evaluation is as follows:

The resulting rates of return for each alternative analyzed and for each evaluation, have been presented in the following Table I-5.

These rates of return has been considered with regard to total investment, (as there is no own investment capital in this project and funding has been assumed to be obtained from a loan or from donations).

After the analysis of the results of the evaluations made, only the Base Case A and B, and Alternate 3 have been considered feasible from and economic point of view. For these, the break-even points for Base Case A, B and Alternate 3 resulted to be:

Base Case A: 66% of the Centre's capacity

Base Case B: 37% of the Centre's capacity

Alternate 3: 65% of the Centre's capacity

Complete details of the evaluations, including balance sheets, sensitivity analysis charts, and computer print-outs etc., have been included in Volume III, Chapter II.

It is important to note that the Centre would become economically self-supporting, (considering most likely values for all variables), at the following times:

Base Case A: Third year of operation

Base Case B: Second year of operation

Alternate 3: Fifth year of operation

TABLE I-5

## SUMMARY OF FINANCIAL EVALUATIONS - SENSITIVITY ANALYSIS

EVALUATION NO	PARAMETER	TREND OF THE PARAMETER	% VALUE	BASE A		BASE B		ALT-1		ALT-2		ALT-3	
				R.R.	P.B.	R.R.	P.B.	R.R.	P.B.	R.R.	P.B.	R.R.	P.B.
1	Base Case	---	---	0,8	4	42,6	2	---	>11	---	>11	5,4	4
2	Sales	High	+10%	8,6	3	54,5	1	---	>11	---	>11	13,4	3
3	Sales	High	+5%	4,8	4	48,6	2	---	>11	---	>11	9,6	3
4	Sales	Low	-5%	---	5	36,4	2	---	>11	---	>11	0,4	4
5	Sales	Low	-10%	---	7	30	2	---	>11	---	>11	---	6
6	Investment	High	+10%	---	5	38,8	2	---	>11	---	>11	2,2	4
7	Investment	Low	-10%	4,2	4	51,4	2	---	>11	---	>11	8,8	3
8	Salaries	High	+10%	---	5	38,8	2	---	>11	---	>11	2,6	4
9	Salaries	Low	-10%	3	4	46,6	2	---	>11	---	>11	7,8	3
10	Loan Interest	Low	4%	4,2	3	45,8	1	---	>11	---	>11	8,6	3
11	Loan Interest	High	10%	---	6	39,8	2	---	>11	---	>11	2	5

R.R. = Rate of Return on total investment

P.B. = Pay-back period (years)

--- = Rate of return less than 0,2%

#### D. Financial Sources

Funds for financing the implementation of the Centre and its operating costs could be obtained from different financial sources.

1. For the implementation of the Centre, the funds could be sought from a loan from official banking institutions (Volume III, Exhibit II, lists some of these). In this regard it should be noted that a loan from such a source can only be granted to a government. Therefore, if the Centre is considered as an Intergovernmental Agency, one of the member governments has to be appointed as the loan guarantor. This government should arrange the share of responsibilities and guarantees with the other member governments. The Host Country Government could be considered to be this loan guarantor who would arrange the share of responsibilities. The loan should provide funds to cover the Centre's losses until it becomes economically self-supporting.
2. To finance the operating costs, including repayment of the implementation loan and its financial charges, different sources of revenues may be considered.
  - a. Revenues of the Centre as a result of the sales of its services to any interested parties. For example, the possibility to sign long term contracts for training, feasibility studies, design and installation of plants, and quality control services with official banking groups such as Arab Development Bank and African Development Bank has been identified. The Centre could also act as an Advisor for the pharmaceutical industry for such groups.
  - b. Annual quotas from member countries, which in turn would have the privilege to use the Centre services free of cost.
  - c. Assigning the Centre a certain percentage (say 0,5 % to 1%) of the funds assigned by United Nations Development Programme (UNDP) through the Indicative Planning Figure (IPF) to Developing Countries who become members. A rough estimate indicates that if only 60 countries become members of the Centre and assign 1% of their IPF, and considering that the range of equivalent funds is from 10,000 to 100,00 US \$ per year, at least 3,000,000 US \$ per year could be easily obtained, which covers about 40% of the running costs in the first year and 36% in the fourth year (which is the first year of operation at full capacity) for the Base Case, with all investment funds obtained from a loan.
  - d. For the training services of the Centre some revenues could be obtained from the Technical Cooperation among Developing Countries (TCDC) and U.N. Agencies programmes for this purpose.

3. The Centre should consider among its operating costs a certain amount to finance travel and expenses for those countries which cannot afford such expenditures and may need the services or advice of the Centre. The Centre should also consider among its operating costs membership of three or four of the least Developed Countries at no charge.

#### I-14 RECOMMENDATIONS (PLAN OF ACTION)

This article responds to points 3 and 4 of the Terms of Reference. Consistent with the objectives established for the Centre, its concept and potential market, and the conclusions stated above, the following Plan of Action is recommended:

- A. That an International Centre for Information, Training and Development of Pharmaceutical Technology (ITPT) be established.
- B. That the ITPT be implemented and operated under the basic concept of being a non-profit Centre, but self sustaining.
- C. That funds for the implementation be obtained from official banking and financial institutions, grants from the Host Country, grants from member countries or Foundations, etc. or any combination of the above.
- D. That the operating cost of the Centre be covered by the incomes from sales of the Centre services to those Developing Countries whose economical situation allows them to do so, to any other interested party, and from yearly quotas from member countries.
- E. That the Institutional Status of the Centre be "International". The following possibilities are proposed:
  1. To establish the Centre as an Independent International Body under multilateral convention ratified by interested Governements.
  2. To establish the Centre as a subsidiary of UNIDO, United Nations.
  3. To establish the Centre under the auspices of the Host Government as an Institution, in accordance with the applicable laws: either.
    - i. Linked to UNIDO for cooperation or,
    - ii. By the formation of a Foundation by the Host Government or any other Government, with requests to other Governments to contribute towards it.

Further details are given later in this report (see volume III, Chapter I)

Member governments must make the final selection and decision on these or other possibilities suggested by them. However, the first two possibilities proposed herein are emphasized.

- F. That the construction of the building be done immediately and in one single stage. However, other alternatives are proposed in case that this recommendation could not be accomplished.
- G. That the entering into operation of the different services or Units of the ITPT be in a progressive way in the shortest period, that is to say, within six (6) months of the completion of the construction of the facilities or at a slower rate if the demand for services does not develop that fast.
- H. That the management staff be constituted immediately after the approval of the Centre or at the moment when the construction contract for the Centre is awarded.
- J. That the sequence for the implementation of services be as follows (in case that the Centre be constructed as one single facility):
  - 1. Establishment of an Information unit on prices of pharmaceutical products, status and services of technologies, product ,market situation, trade information, productions and imports of pharmaceutical drugs, recordings of needs, achievements and programmes of developing countries, and data about processes and products.

The ITPT should collaborate or promote the establishment of programmes or priorities for the authorization and acquisition of drugs. These programmes provide the suitable framework on which to base the selection of pharmaceutical products required to satisfy the medical needs and the economy of each country.

Simultaneously to this Unit, or even before, a Coordination and Planning Unit should be established and become operative. This Unit will serve to the Centre itself and to developing countries.

- 2. Establishment of an Analytical and Quality Control Unit. This would lead to the purchase of higher quality drugs and raw materials and to ensure the quality level to international standards, reducing therefore the risk and percentage of rejections. It will also provide pharmacopeia and methodology for different types of productions to final quality control assurance at industrial level.

Initiation of research and development activities in different countries upon request for specific problems that might arise, e.g. research on the effects of new or existing drugs on certain diseases whose therapeutic results are not satisfactory in specific zones.

Establishment of mobile Quality Control Modules at or to be sent to the Developing Countries for on-site quality control of raw materials, intermediates and finish products and stability control in tropical climates.



3. Establishment of Training Units for the activities under points 1 and 2 above.
4. Establishment of applied research, development and training Unit in the cultivation of medicinal plants, completed with a botanical laboratory. The Centre should establish services and personnel to perform field tests on this subject upon request.
5. Establishment of formulation and packaging facilities. These facilities are expected to be of great advantage to developing countries due to the actual structure of the pharmaceutical industry in such countries, and would facilitate the procurement of drugs in bulk.

Establishment of training services for the above.

6. Establishment of a semi-industrial scale pilot plant for development and applied research on synthetic drugs. This pilot plant would be complemented with the formulation and packaging facilities mentioned in point 5 above.

This service should permit the promotion of local manufacture of synthetic drugs.

7. Establishment of semi-industrial scale pilot plant for extraction of active substances from medical plants. This plant would be complemented with the formulation and packaging facilities mentioned in point 5 above.

This service will promote the production of drugs of natural origin from local raw materials.

8. Establishment of the Applied Research Laboratories Unit to provide chemical, biochemical, microbiological, pharmacological and toxicological applied research.

Establishment of training services covering processes, plant cultivation and applied technology research.

9. After several years of operation of the former activities, the ITPT should proceed to the establishment of a Technology and Engineering Advisory Services for the promotion of the installation of production plants, designed with the most up-dated systems and adapted to the specific needs and circumstances of Developing Countries.

Should the Centre be established with three different facilities scattered in several countries, the recommended sequence would be. First that block defined as alternative case 1; second, the block defined as alternative 2, third, the block defined as alternative 3. This scheduling is based on the above recommended programme for starting of activities.

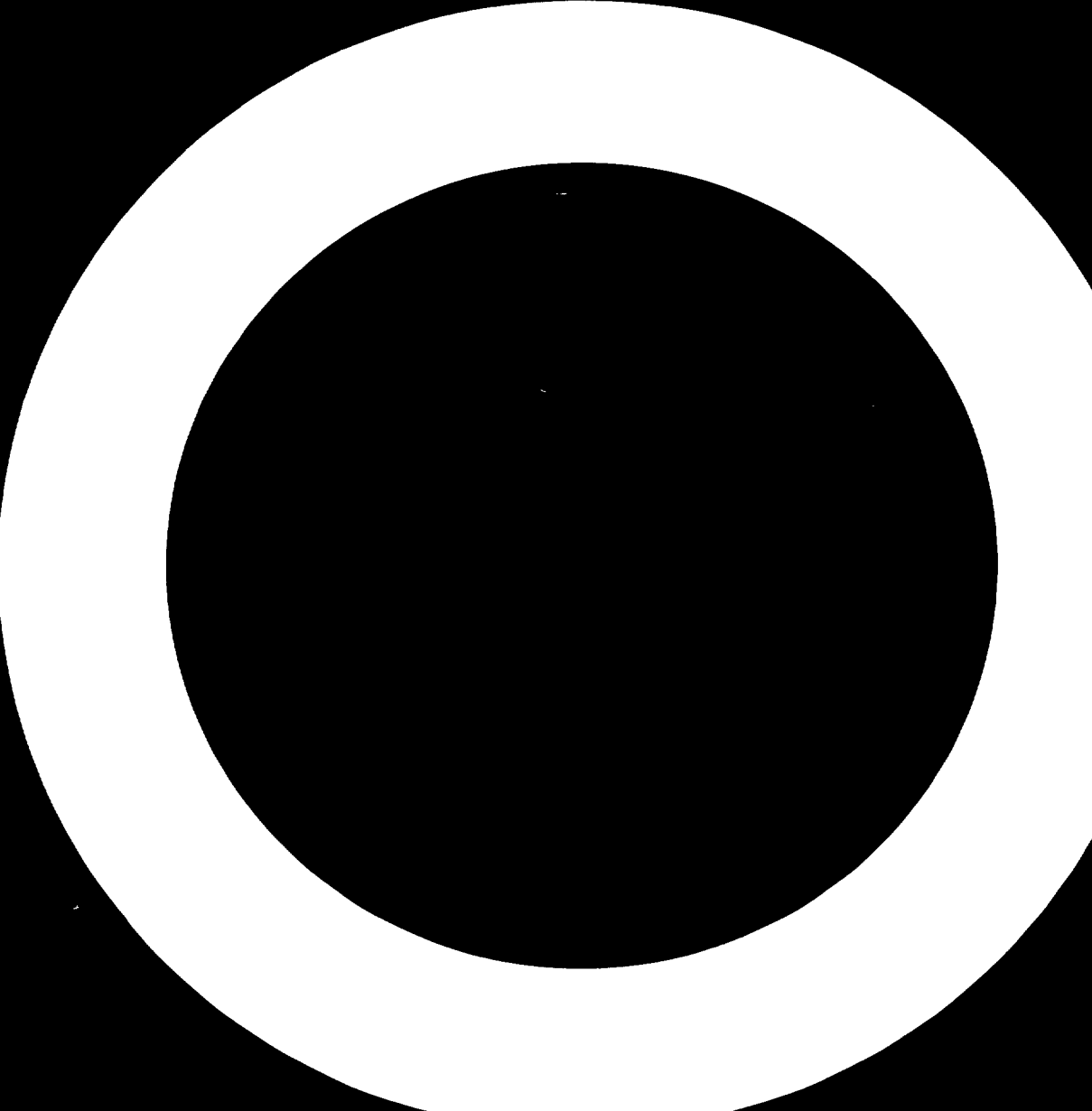
- K. That the governments of the developing countries give full support to all projects connected with the activities of the Centre. Laws promoting the strict quality control of all imported and exported drugs, the installation of plants and the expansion of existing facilities with independent and objective technological and financial analysis supporting such decision to prevent inefficient operations, and the promotion of university level graduates training, would greatly help to the success of the Centre.
- L. That the above Plan of Action concerning the implementation of the activities of the Centre be supplemented by a careful selection of the senior staff of the Centre in all the various posts, so that with their own individual areas of knowledge being fully integrated, the Centre be able to produce results of high scientific and practical value.

In regard to this Plan of Action for the Centre, it must be considered that some of these activities already exist in the developing countries. It is possible that each of them, when considered individually, may appear to be inadequate to solve the problems presented by the various specialities. From a general point of view, however, this group of countries has some research infrastructure which, if efficiently utilized together with the Centre, could multiply the results.

In saying this, it is not being suggested that the Centre should control each of the research groups but, on the contrary, that requests be made that the existing activities should support it and that any duplication by the Centre of work already carried out should be avoided.

For this reason, the Centre must maintain very flexible contacts with the research groups in the different countries and also with the industrial sectors (private and public) and with Government Institutions and Authorities. It is therefore recommended that consultation meetings be organized among all the various sectors.

All these aspects call for the collaboration with UNIDO of international agencies whose activities are related or supplementary for achieving at the objectives mentioned in this document.



ACKNOWLEDGEMENTS

FOSTER WHEELER IBERIA, S.A. wishes to acknowledge the help and express its most sincere thanks for the collaboration it is receiving in connection with this work and specially that received from the following people:

Dr. A. Tcheknavorian Asenbauer  
Chief of Pharmaceutical Industries Unit,  
UNIDO - Vienna

Mr. M. Majid,  
Senior Industrial Officer  
UNIDO - Vienna

Mr. P. Neumann,  
Chief of Legal Liaison Unit  
UNIDO - Vienna

Mr. Leonel D. Canelas,  
Adjunt of Secretary of State for Industry  
Ministry of Industry - Portugal

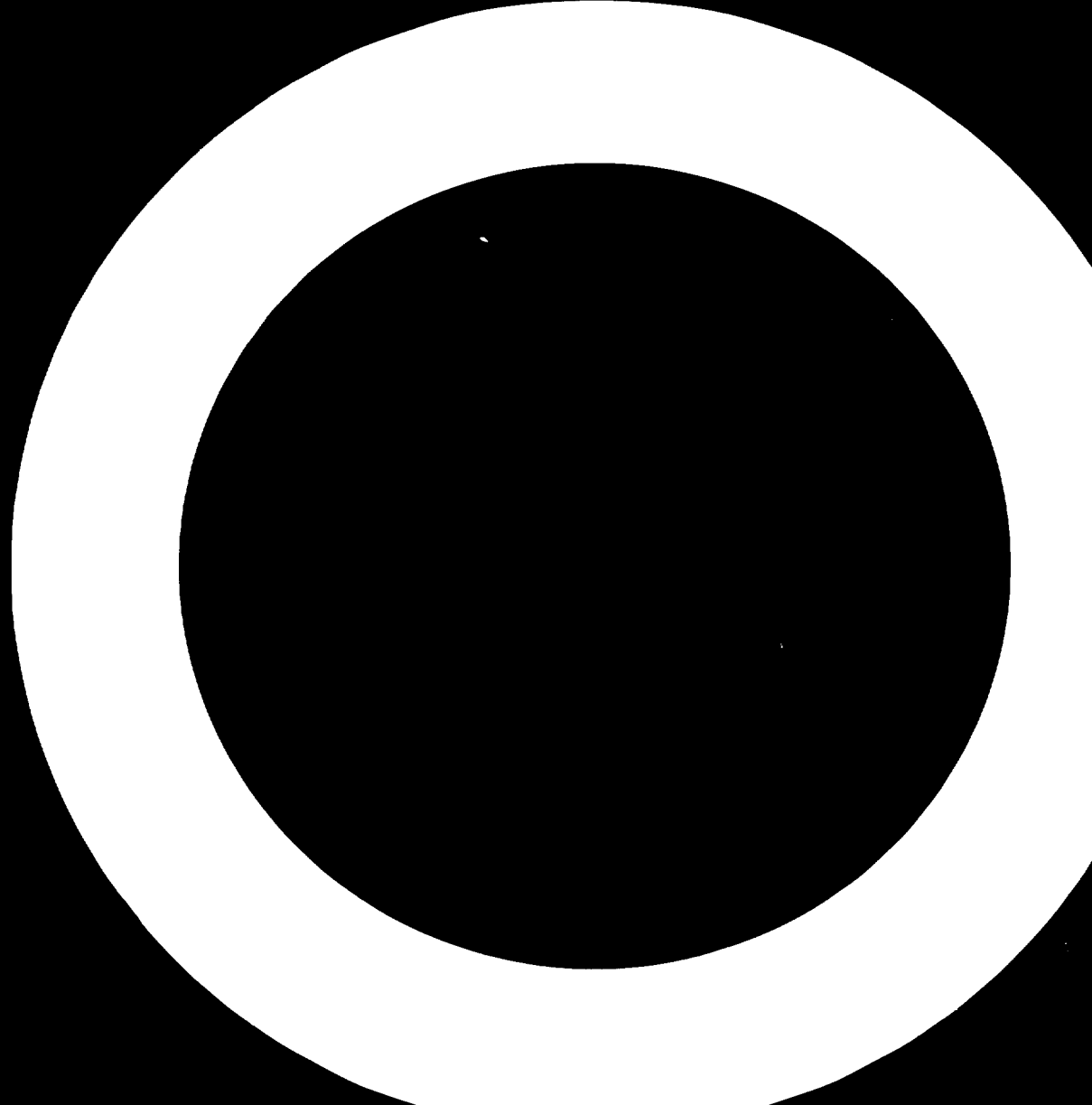
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Ministry of Foreign Affairs - Portugal

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Ministry of Industry - Portugal

Mr. C. Adriaio Rodrigues  
Legal Advisor of LNETI  
Ministry of Industry - Portugal

Ms. Inés Florencio  
Director of Chemical Industry & Technology Dept. LNETI  
Ministry of Industry - Portugal



## CHAPTER III

### COUNTERPARTS

List of countries whose Health Ministries have been contacted by the Consultant:

Argentina	Bangladesh	Cameroun
Afghanistan	Benin	Republique Centrale Africaine
Albania	Bhutan	Chad
Algerie	Bolivia	China
Angola	Botswana	Colombia
	Brazil	Congo
	Bulgaria	Costa Rica
	Burma	Cuba
	Burundi	Cape Vert
Djibouti	Ecuador	Gabon
Dominican Republic	Egypt	Gambia
	El Salvador	Ghana
	Ethiopia	Guatemala
		Guinea Bissau
		Guinea Ecuatorial
Haiti	India	Jamaica
Haute-Volta	Indonesia	Jordan
Honduras	Ivory Coast	
Kenya	Lesotho	Madagascar
Korea (North & South)	Liberia	Malawi
Kuwait	Laos	Malasya
		Mali
		Mauritania
		Mexico
		Mongolia
		Morocco
		Mozambique

Nepal  
Nicaragua  
Niger  
Nigeria

Pakistan  
Panamá  
Papua New Guinea  
Paraguay  
Perú  
Phillipines

Romania  
Rwanda

Senegal  
Sierra Leone  
Somalia  
Sri Lanka  
Sudan  
Suriname  
Swaziland  
Syria  
Saudi Arabia

Tanzania  
Thailand  
Trinidad & Tobago  
Togo  
Tunisia  
Turkey

Uganda  
United Arab Emirates  
Uruguay

Venezuela

Qatar

Vietnam

Yugoslavia  
Yemen Arab.Rep.  
Yemen PDR

Zaire  
Zambia  
Zimbabwe

Visits had been made to Pakistan, Egypt, Iraq, Jordan, Sudan, Madagascar, Nigeria, Argentina, Saudi Arabia and Portugal.

PROJECT BACKGROUND

IV-1 Project Background

The idea for the project is the establishment of an International Centre for Information, Training and Development of Pharmaceutical Technology (ITPT) aimed to facilitate the supply of information, the applied research, development and adaptation of technology available for the production of synthetic drugs and medicinal plant extracted drugs to Developing Countries, to encourage and make available training for trainees of Developing Countries in the research and drug manufacturing techniques; to stimulate and extend the quality control procedures for finished products, raw materials and intermediates, and to provide quality control services for products either imported or produced in Developing Countries in consistency with the statements of the Lima Declaration, the Declaration of the Alma-Ata Conference for Primary Health Care and the conclusions of the Second Panel Meeting of Experts for the Pharmaceutical Industry at Vienna, in order to meet the fulfillment of the pharmaceutical needs of Developing Countries to achieve their health care needs in the light of the requirements of the economics of health.

The project parameters that served as guiding principles during the preparation of the study were: the identification of the countries that could and wish to use services of the ITPT, the extent in which these or other countries would use such services; the interest of Developing Countries in such Centre, the definition of the Centre facilities, its organization, the activities of the Centre, the implementation programme and the costs (investment and operational) of the ITPT. The suggestions for the appropriate Institutional Status of the Centre are aimed to ensure its independence and attractiveness for the possible user countries, as this is one of the most important points to be considered.

The prevailing idea is that the ITPT must not obstruct or reduce existing markets. Special emphasis has been placed to demonstrate that the ITPT is aimed to cover the gap existing between Developing Countries and Developed Countries to enable a more coordinated and efficient collaboration in the pharmaceutical industry, improving the use of natural resources in Developing Countries and extending and rising the health level in such countries at a minimum cost, whilst taking advantage of raw materials and subproducts that appear during the transformation processes, which may improve the situation of local industries even not directly related to the pharmaceutical industry.



#### IV-2 Project Promoter

The project promoter is the Secretariat of the UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION, A-1400, P.O. Box 300, Vienna (AUSTRIA), in response to a request from a group of developing countries. The project was initiated as a result of the First Consultation Meeting for the Pharmaceutical Industry held at Estoril (Portugal) in 1980 and the subsequent follow-up meeting held in Mohammedia (Morocco) in 1981.

#### IV-3 Project History

In the course of the First Consultation Meeting on the Pharmaceutical Industry held at Estoril, Portugal in December 1980, some delegations and groups of countries suggested that the UNIDO Secretariat should consider the possibility of establishing an International Centre for Information, Training and Development of Pharmaceutical Technology. It was envisaged that the Centre would undertake research and develop technology on behalf of governments and industry in developing countries as well as conduct related activities such as quality control, training personnel and providing technical information.

At a follow-up meeting held in Mohammedia (Morocco), on Co-operation among developing countries in December 1981, the UNIDO Secretariat announced that the Portuguese Government was interested in establishing such a Centre and would soon discuss the project with UNIDO officials. It was suggested that the proposed Centre should concentrate on process development for drugs produced by chemical synthesis and by extraction from medicinal plants. It was understood that a research centre for antibiotics by fermentation processes would be established with UNIDO support at another location.

In January 1982 a UNIDO delegation visited Lisbon. Officials of the Portuguese Government confirmed the willingness of Portugal to host such a Centre and to make it available.

It was agreed that a preliminary techno-economic study of the project should be made to establish the scope of activities of the Centre and the financial requirements to implement the project. To make this study the Portuguese Government requested UNIDO to provide international experts to assist a Portuguese team of experts.

In March 1982, a UNIDO Consultant, working with a Portuguese team of experts, prepared a report which confirmed that physical and human resources and infrastructure for such a project was available in Portugal. This report was published by the Ministry of Industry of Portugal, Direção General das Industrias Quimicas e Metalurgica, on April 5th, 1982.

A UNIDO official then held discussions with officials of the World Bank in June 1982. Their suggestions regarding the scope of the Feasibility Study, and in particular the need to demonstrate the financial viability of the proposed Centre, are being incorporated in the present study.

Finally, in July, 1982, UNIDO officials and Portuguese experts discussed in details the scope of the Feasibility Study. These discussions also confirmed that the aim of the Centre should be a non-profit organization which after a certain period of years could be placed on a self-financing basis and on the other objectives stated in this Report.

In April 1983, UNIDO awarded a contract to Foster Wheeler Iberia to perform the Feasibility Study to determine the characteristics of the Centre, identify the potential markets and to investigate the economical and technical viability of the Centre.

The activities in the preparation of the Feasibility Study have concentrated in obtaining and analyzing supporting data by obtaining information on the most frequent diseases in the developing countries and how they are treated, data on existing production facilities, packaging regulations, prices, raw materials available, quality control needs, human resources and needs for specialized education, etc. A special effort has been made to assess the real interest of developing countries in this Centre. Unfortunately, not enough answers have been obtained to date to draw definite conclusions. The study has also been devoted to define the International Centre Information, Training and Development of Pharmaceutical Technology; its specific activities based on the needs found to establish its investment costs and operating costs, its financial feasibility, the subvention level required and the possibilities to become self-sufficient. The financial study has been done on the premise that the Centre will be a non-profit Centre. The countries contacted and/or visited by Foster Wheeler Iberia are those listed in Chapter III: Counterparts.

#### IV-4 FEASIBILITY STUDY AUTHORS

This Feasibility Study has been prepared by a Team from Foster Wheeler Iberia, S.A. Below we summarize the different groups of the team, the main activities performed by each group and the background of the group leaders. In Annex I to this Volume I, there is also a brief summary of Foster Wheeler Iberia's background in the pharmaceutical industry.

##### Team Leader (Project Director)

Mr. E.W. Sommer, V.P., P.E., M.B.A., M.M.E.

His main activity has been the management and coordination of all activities of the various groups, representing Foster Wheeler Iberia S.A. in all discussions and meetings with UNIDO and Portuguese Government officials.

##### Deputy Project Director

Mr. J.F. Benlloch, Ph. D., E.M.E.

Assistant to the Project Director in the performance of all of the activities mentioned above.

Synthetic Drugs and Quality Control Group

Group Leader: Mr. E. Abad, M.Ch.E.

Main group members: Mr. C. Dicenta, M.D., Ph.D., Consultant

Mr. A. Prieto, Ph. D. Microbiology, Consultant

Mr. J.A. Rodriguez, M.D., Consultant

This group carried on all activities related to the Centre's market survey in this sector covering activities that the ITPT Centre could perform in connection with synthetic drugs and quality control. Also the concept and design of the synthetic drug pilot plant, formulation and packaging pilot plant, and quality control laboratory, was executed by this group, who in addition, coordinated and assembled the whole Centre design with the information received from other groups.

Medicinal Plant Drugs Group

Group Leader: Mr. U. Malik, M.S.Ch., FDA Licensee

Main group members: Mr. J. Nascimento, Ph.D.Ch.E., University Professor,  
Consultant

Mr. A. Gonzalo, M.S.I.E.

This group performed the activities directed at identifying the medicinal plant drugs market for the ITPT Centre, and specified the ITPT facilities required for the medicinal plant drugs pilot plant, greenhouse, botanical laboratories, etc.

Architecture Group

Group Leader: Mr. F. Martinez, M.S., Architect

Main group member: Mr. C. Pascual B.S., Architect

This group designed the building, its services and installations, as required to house the Centre's facilities (laboratories, pilot plants, offices, etc.) with the assistance of the drafting section and in coordination with the former groups.

Estimating Group

Group Leader: Mr. L. Gallego, M.S. I.E.

Main group members: Mr. M. Caballero, M.S.I.E.

Mr. E. Alvarez, M.S.I.E.

This group obtained quotations for the equipment, materials and labour required to evaluate the investment and operating cost of the ITPT Centre. In coordination with the Financial Group this group also prepared the financial evaluation.

#### Financial Group

Group Leader: Mr. E. Solozábal, Economist

Main group member: Mr. J. Saz, Economist

This group performed the financial viability calculations and evaluation, in coordination with the rest of the groups and using their outputs as the required input to develop the financial analysis.

#### Legal Group

Group Leader: Mr. F. Lara, Attorney.

Main group members: Ms. C. Zarco, Attorney.

Mr. L. Mingo, Attorney.

This group handled the activities related to the study of the alternatives for the Institutional Status of the ITPT Centre, the pharmaceutical industry patent status and the preparation of suggested legal aspects for the Centre's implementation.

EXHIBIT I-1 - TERMS OF REFERENCE PROVIDED BY UNIDO

TERMS OF REFERENCE FOR SUB-CONTRACT TO PREPARE FEASIBILITY STUDY  
ESTABLISHING AN INTERNATIONAL CENTRE FOR INFORMATION,  
TRAINING AND DEVELOPMENT OF PHARMACEUTICAL TECHNOLOGY

1. General Background Information

In the course of the First Consultation on the Pharmaceutical Industry held at Estoril, Portugal, in December 1980, some delegations and groups of countries suggested that the UNIDO secretariat should consider the possibility of establishing an International Centre for Information, Training and Development of Pharmaceutical Technology. It was envisaged that the Centre would undertake research and develop technology on behalf of governments and industry in developing countries as well as conduct related activities such as quality control, training personnel and providing technical information.

At a follow-up meeting held in Mohammedia, Morocco on Co-operation among developing countries in December 1981, the UNIDO secretariat announced that the Portuguese Government was interested in hosting such a Centre and would soon discuss the project with UNIDO officials. It was suggested that the proposed Centre should concentrate on process development for drugs produced by chemical synthesis and by extraction from medicinal plants. It was understood that a research centre for producing drugs, in particular antibiotics, by fermentation process would be established with UNIDO support at another location.

In January 1982 a UNIDO delegation visited Lisbon. Officials of the Portuguese Government confirmed the willingness of Portugal to host such a Centre and to make available:

"an adequate scientific and technological environment and necessary space for its installation".

The Government also agreed to provide temporary premises together with a team of Portuguese and industrial experts so that the project could be initiated at the beginning of 1984. It was further agreed that a techno-economic study should be made of the project to establish the scope of activities of the Centre and the financial requirements to implement the project. To make this study the Portuguese Government requested UNIDO to provide international experts to assist a Portuguese team of experts.

In March 1982 a UNIDO Consultant, working with a Portuguese team of experts, prepared a report which confirmed that physical and human resource infrastructure for such a project was available in Portugal. This report also clarified further the contribution which the Host Country could make to the establishment of the project.

A UNIDO official then held discussions with officials of the World Bank in June 1982. Their suggestions regarding the scope of feasibility study, and in particular the need to demonstrate the financial viability of the proposed Centre, have been incorporated in the present document.

Finally, in July 1982, UNIDO officials and Portuguese experts discussed in detail the scope of the feasibility study and agreed on the outline contained in the present document. These discussions also confirmed that the aim of the Centre should be a non-profit organization which after a period of years can be placed on a self-financing basis and the other objectives described below.

## 2. The Aim of the Project

The aim of the work of the contractor is to assist UNIDO in preparing a feasibility study which will facilitate the eventual establishment of the International Centre for Information, Training and Development of Pharmaceutical Technology. The objectives of the Centre will include the following:

- a) to assist the developing countries in acquiring technology for the production of bulk drugs and intermediates manufactured both by chemical synthesis and extraction from medicinal plants;
- b) to provide training for trainees from developing countries on research and development, in particular as regards the development and adaptation of technologies;
- c) to provide quality control and assurance services on behalf of governments for drugs manufactured in or imported into developing countries.

For these purposes the Centre may undertake:

- i) contract and non-contract research, and other activities on behalf of Governments and industry in developing countries;
- ii) sub-contract specific programmes as required and monitor them on behalf of Governments and industry in developing countries.

3. The contractor is expected to prepare a feasibility study according to the outline given in Annex A. The major chapters of the study will be as follows:

- Identification of potential markets for the Centre's activities;
- Proposed activities and programme for the Centre;
- Institutional status and Charter of the Centre;
- Timetable for establishing the Centre;
- Estimated annual revenue of the Centre;
- Estimated investment costs and annual operating costs of the Centre;
- Financial viability of the Centre;
- Recommendations.

## ANNEX A

### FEASIBILITY STUDY ESTABLISHING AN INTERNATIONAL CENTRE FOR INFORMATION, TRAINING AND DEVELOPMENT OF PHARMACEUTICAL TECHNOLOGY

#### 3. Identification of potential markets for the Centre's activities

In order to establish the activities of the Centre, the market for the following potential activities of the Centre will be examined:

##### 3.1. The general background

a). review information provided by UNIDO and other sources on the essential drugs most needed by developing countries and their intermediates, raw materials and chemicals needed for their manufacture, according to prevailing disease patterns;

b). prepare information for these drugs on the present and future (1990) levels of consumption, imports and production in developing countries.

##### 3.2. Drugs produced by chemical synthesis

a). based on the above, select a group of essential drugs which have the potential to be produced by chemical synthesis in developing countries;

b). for this group of drugs, analyze the different types of technology involved and the patent situation on each drug (on the product itself or on the process);

c). identify and suggest a programme of research activities required for the development of technology required to manufacture the above essential drugs and their intermediates for which either technology is not available in the market or if so, is for large-scale production and consequently inappropriate to the market size of the developing countries;

##### 3.3. Drugs extracted from medicinal plants

a). review information presented by UNIDO and other sources on active ingredients extracted from medicinal plants to be used in modern medicine; identify the medicinal plant used in traditional medicine in developing countries, if possible, with their location and cultivation aspects as well as their growth potential;

b). assess how these medicinal plants can contribute as a supplement to the existing range of chemically-based drugs produced to cover all diseases;

c). assess the existing technologies for the production of active ingredients from medicinal plants, and their availability to developing countries in order to suggest a programme of research activities to develop a new technology either where there is no technology available, or where there are constraints which impede developing countries exploiting existing technologies;



d). taking into account the above analysis, asses the existing infrastructure in developing countries and the areas to be developed (including their training requirements) so that developing countries can assimilate the technologies to be developed by the Centre;

3.4. Proposed research activities of the Centre

a). identify the developing countries that are prospective customers for acquiring technology from the Centre for the synthesis or bulk drugs and their intermediates, for the extraction of active substances from medicinal plants and/or for the preparation of extracts from natural origin;

b). assess as far as possible, the interest of the developing countries in using the Centre's research activities in this way:

3.5. Proposed supporting activities of the Centre

Consider the type of advisory services required by developing countries in the following fields and analyze ways in which the Centre might implement them;

- a). provision of technical information
- b). feasibility studies
- c). patents of processes and products
- d). transfer of technology and licensing.
- e). harmonization of laws on registration and promotion of drugs.
- f). procurement of bulk drugs, intermediates and raw materials
- g). programme of co-operation among developing countries
- h). training of research and other personnel from developing countries.

4. Proposed activities and programme for the Centre

(a) Describe the proposed activities and programme of the Centre for the first five years; in addition indicate further possible developments in the long-term programme of the Centre;

b) Propose an organization structure of the Centre in order to fulfil its activities. The following activities, among others, should be considered:

- i) process development on a laboratory scale;
- ii) process development in a pilot plant at semi-industrial level;
- iii) technical advisory services, including quality control;
- iv) management and administration.

c) Estimate the number and skills of the personnel of the Centre;

d) Describe the building required by the Centre;

e) Describe the equipment required by the Centre;

- f) Describe the infrastructure facilities required by the Centre and their availability at the proposed site for the Centre.

5. Institutional Status and the Charter of the Centre

Suggest alternative versions of possible Statutes governing the Centre's establishment and operation, taking into account the following:

- a) The basic concept of the Centre and the limits of its activities;
- b) The legal status of the Centre in relation to the host country, the United Nations and the developing countries;
- c) The status of the Centre's personnel (national and international);
- d) The non-profit-making basis for the Centre and its status as regards taxation, import duties on supplies or equipment and raw materials into the host country;

6. Timetable for establishment the Centre

Prepare a time-table for establishing the Centre covering the first five years including tables showing the phased development of the physical facilities and the number of staff employed.

7. Estimated annual revenue of the Centre

Estimate the revenues of the Centre for each of the proposed activities over the first five, and if possible, the first 10 years. In this connection:

- a) Estimate the verances that might be obtained from sales of products. For this consider the annual utilization (research and production) of the capacity of the multi-purpose plant for synthetics, and the pilot plant for extraction of active ingredients from natural origin. Prepare a tentative programme of production that would make full utilization of these plants, so that their output can be sold to developing countries under long term supply contracts;
- b) Estimate the revenues that might be obtained from the supply of technical information and other technical advisory services;
- c) Estimate the revenue that might be obtained by licensing the technologies developed by the Centre to developing countries;
- d) Estimate the revenues that might be obtained by the Centre from providing training courses for participants from developing countries;
- e) Estimate the revenues that might be obtained by providing a quality control and assurance service on behalf of Governments of developing countries.

8. Estimated investment costs and operating costs of the Centre

Prepare detailed estimates of the investment costs required for each stage of development of the Centre over the first 5 years, of the working capital required, and of the total operating costs in each of the first five years. These estimates should be prepared under the following headings:

a) Investment Costs

- Machinery and equipment
- freight and insurance (if not purchased locally)
- installation
- land and buildings
- pre-operating expenses
- training

b) Working Capital

- Stocks of materials (3 months)
- Wages and salaries (2 months)
- Stocks of unsold pharmaceutical products

c) Annual operating costs

- Sub-contracted services
- Wages and salaries (including management and sales costs)
- Utilities
- Materials
- Repairs and maintenance
- Bank interest
- Depreciation of building equipment
- Travel of staff
- Insurance
- Other costs

9. Financial viability of the Centre

Demonstrate the financial viability of the Centre as self-financing non-profit making Organization by preparing the following financial estimate:

- a) Profit and loss statements for the first five years;
- b) Cash flow analysis for the first five years showing the sources and uses of funds;
- c) Proposed financing plan and possible sources of finance;
- d) Cost benefit analysis that justifies special initial financial support.

10. Recommendations of the Consultants

Prepare brief recommendations for the consideration of UNIDO and developing countries in the form of a Plan of Action for establishing the Centre and operating it for the first five years.

EXHIBIT 1-2 GENERAL INFORMATION ABOUT THE  
CONSULTANT (FOSTER WHEELER IBERIA,S.A.)

EXHIBIT I - 2

CONSULTANT'S BACKGROUND

Foster Wheeler Iberia, S.A. is a member company of Foster Wheeler International Corporation, a worldwide organization with activities in the chemical, petrochemical energy and pharmaceutical industries. Foster Wheeler Iberia Pharmaceutical Division's efforts have been dedicated to most of the activities within the pharmaceutical industry other than production. As a consulting and engineering division, its background in this field has been the preparation of pre-feasibility and feasibility studies, arrangement of T.O.T. agreements, execution of pharmaceutical projects for antibiotics, vitamins, analgesics, and veterinary drugs, technical assistance to clientes, etc.

The following reference list illustrates FOSTER WHEELER's experience in Pharmaceutical Plants. Among the Clients listed are leading names in the industry. The geographical location of the projects gives some indication of the worldwide experience and capability of the FOSTER WHEELER Organization.

<u>COMPANY &amp; LOCATION</u>	<u>TYPE OF PLANT</u>	<u>CAPACITY (MT/Y)</u>	<u>LICENSOR</u>	<u>COMPLETION DATE</u>
MERCK CHEMICAL DIVISION Le Puy, France	Bulk manufacturing of intermediates	-	Merck	1985
A.C.D.I.M.A/A.C.A.I. Baghdad, Iraq	Multipurpose Antibiotics Plant	-	Antibio- ticos,S.A.	1985
E.R. SQUIBB Humacao, Puerto Rico	Synthetic Organic Bulk Manufacturing of intermediates	-	Squibb	1984
SCHERING-PLOUGH Jacarepagua, Brazil	Steroids	-	SP	1984
RHONE-POULENC Queretaro, Mexico	Formulation	-	RP	1984
MERCK & COMPANY Liverpool, England	Biogum	-	Merck	1984
MILES LABORATORIES Mexico City, Mexico	Enzyme	-	Miles	1984

<u>COMPANY &amp; LOCATION</u>	<u>TYPE OF PLANT</u>	<u>CAPACITY (MT/Y)</u>	<u>LICENSOR</u>	<u>COMPLETION DATE</u>
McNEIL CONSUMER PRODS. Austin, Texas, USA	Tylenol Granulation	-	Owner	1983
McNEIL CONSUMER PRODS. Ft. Washington PA - USA	Acetaminophen	-	Owner	1983
CIBA-GEIGY Italy	Bulk chemicals	-	Ciba	1983
SYNTEX Mexico City, Mexico	Formulation	-	Syntex	1983
SYNTEK Mexico City, Mexico	Oral Contra- ceptives	-	Owner	1983
McNEIL CONSUMER PRODS. U.S.A.	Aspirin	-	Owner	1982
HOFFMAN-LA ROCHE Dairy, Scotland	Vitamin C	40 T/D	HLR	1982
MERCK, SHARP & DOHME DE ESPAÑA Madrid, Spain	Pharmaceuticals	-	Merck	1980
HOFFMAN-LA ROCHE Belvedere, N.J. U.S.A.	Vitamina C	13,000	HLR	1979
AMERICAN CYANAMID Resende, Brazil	Malathion	6,8	American Cyanamid	1978

<u>COMPANY &amp; LOCATION</u>	<u>TYPE OF PLANT</u>	<u>CAPACITY (MT/Y)</u>	<u>LICENSOR</u>	<u>COMPLETION DATE</u>
TECHMASHIMPORT Oufa, U.S.S.R.	Linear Alcohol	48,000	Conoco	1977
SHELL CANADA LTD. Sarnia, Ontario Canada	Isopropanol	81,000	Veba	1977
FARMITALIA Settimo Torinese Italy	(Confidential)	Antibio- tic Plant	Ciba	1976
U.S. STEEL CHEMICALS ALS Haverhill, Ohio U.S.A.	Bisphenol "A"	54,000	Phone	1976
ITALPROTEIN, SpA Sardinia, Italy	Protein from Petroleum	91,000	BP	1975
FERVET, SpA for Ciba Torre Annunziata Italy	Fermentation Plant	(Confiden- tial)	Ciba	1975
BASF Wyandotte Kearny, N.J. U.S.A.	Syestuffs Manufacture	-	BASF	1973
E.PAKISTAN DEVELOP- MENT CORP. Dacca, Pakistan	Streptomycin	18	Squibb	1972
BRISTOL MYERS Italy	Penicillin	-	Bristol Myers	1971
SFBP Lavera, France	Protein from Petroleum	50	BP	1971
HOFFMAN-LA ROCHE Belvedere, N.J. U.S.A.	Engineering Services for Vitamin C Plant	-	Owner	1971
BRISTOL EUROPA SpA Latina Italy	Grass Roots Pharmaceutical Plant	-	Bristol Myers	1970

<u>COMPANY &amp; LOCATION</u>	<u>TYPE OF PLANT</u>	<u>CAPACITY (MT/Y)</u>	<u>LICENSOR</u>	<u>COMPLETION DATE</u>
WYANDOTTE (BASF) Geismar, Louisiana, U.S.A.	Toluene Diiso- Cyanate (includ- ing Phosgene Prod., HCL Reco- very, Storage & Offsites)	11,200	Usines	1966
ETHYL CORPORATION Deer Park, Texas U.S.A.	Long Chain Linear Alcohols		Ziegler	1966



(2 of 3)

UNITED NATIONS

UNITED NATIONS  
DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS



UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO)  
(VIENNA)

FINAL REPORT  
FEASIBILITY STUDY FOR THE ESTABLISHMENT  
OF AN INTERNATIONAL CENTRE FOR INFORMATION,  
TRAINING AND DEVELOPMENT OF PHARMACEUTICAL TECHNOLOGY  
(ITPT)

UNIDO PROJECT UC/INT/82/102

VOLUME II

POTENTIAL MARKET, ACTIVITIES AND DESCRIPTION OF THE ITPT ACTIVITIES

Prepared by  
FOSTER WHEELER IBERIA, S.A. (FWM)  
FWM Reference: MDC 6012

October, 1983

## TABLE OF CONTENTS

	<u>Page number</u>	
 <b><u>VOLUME I - EXECUTIVE SUMMARY</u></b>		
TABLE OF CONTENTS	i	
FOREWORD	v	
EXPLANATORY NOTES	vii	
INDEX OF TABLES, CHARTS AND DRAWINGS	ix	
 <b><u>CHAPTER I - ABSTRACT</u></b>		
ARTICLE I-1	INTRODUCTION	I-1
ARTICLE I-2	PURPOSE OF THE FEASIBILITY STUDY	I-2
ARTICLE I-3	GENERAL CONSIDERATIONS	I-2
ARTICLE I-4	SPECIAL CONSIDERATIONS	I-5
ARTICLE I-5	GENERAL CONCLUSIONS	I-16
ARTICLE I-6	OBJECTIVES OF THE CENTRE	I-17
ARTICLE I-7	ACTIVITIES PERFORMED BY THE CONSULTANT	I-18
ARTICLE I-8	CONCLUSIONS OF THE MARKET SURVEY	I-21
ARTICLE I-9	PROPOSED ACTIVITIES AND PROGRAMME	I-26
ARTICLE I-10	CENTRE DEFINITION AND IMPLEMENTATION ALTERNATIVES	I-28
ARTICLE I-11	LOCATION CRITERIA	I-31
ARTICLE I-12	INSTITUTIONAL STATUS	I-32
ARTICLE I-13	SUMMARY OF INVESTMENT COST, OPERATING COST AND CENTRE'S REVENUES. RESULTS OF THE FINANCIAL EVALUATION. FINANCIAL SOURCES	I-34
ARTICLE I-14	RECOMMENDATIONS (PLAN OF ACTION)	I-38

	<u>Page number</u>
<u>CHAPTER II - ACKNOWLEDGEMENTS</u>	I-43
<u>CHAPTER III - COUNTERPARTS</u>	I-45
<u>CHAPTER IV-1 - PROJECT BACKGROUND</u>	
ARTICLE IV-1      PROJECT BACKGROUND	I-47
ARTICLE IV-2      PROJECT PROMOTER	I-48
ARTICLE IV-3      PROJECT HISTORY	I-48
ARTICLE IV-4      FEASIBILITY STUDY AUTHORS	I-49
 <u>EXHIBIT I-1 - TERMS OF REFERENCE PROVIDED BY UNIDO</u>	 -
<u>EXHIBIT I-2 - GENERAL INFORMATION ABOUT THE CONSULTANT (FOSTER WHEELER IBERIA, S.A.)</u>	-

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**VOLUME II - POTENTIAL MARKET, ACTIVITIES AND  
DESCRIPTION OF THE ITPT CENTRE**

TABLE OF CONTENTS	i
FOREWORD	v
EXPLANATORY NOTES	vii
INDEX OF TABLES, CHARTS AND DRAWINGS	ix
 <u>CHAPTER I - CENTRE'S POTENTIAL MARKET SURVEY</u>	
ARTICLE I-1      INTRODUCTION	II-1
ARTICLE I-2      METHODOLOGY	II-1
ARTICLE I-3      SUMMARIZED STATISTICS FROM THE MARKET SURVEY	II-11
ARTICLE I-4      RESULTS FROM THE MARKET SURVEY. THE ITPT CENTRE PROGRAMME	II-55

	<u>Page number</u>
<u>CHAPTER II - THE ITPT CENTRE ACTIVITIES AND PROGRAMME</u>	II-59
<u>CHAPTER III - THE ITPT CENTRE FACILITIES DESCRIPTION</u>	
ARTICLE III-1 THE ORGANIZATION AND STAFF OF THE CENTRE	II-63
ARTICLE III-2 THE BUILDING DESCRIPTION AND ITS INSTALLATIONS	II-67
ARTICLE III-3 EQUIPMENT LIST	II-73
ARTICLE III-4 CONSUMABLES LIST	II-104
ARTICLE III-5 IMPLEMENTATION SCHEDULES	II-111
<u>EXHIBIT II-1 - QUESTIONNAIRE ISSUED TO DEVELOPING COUNTRIES</u>	-
<u>EXHIBIT II-2 - DESCRIPTIVE DRAWINGS</u>	-

---

**VOLUME III - FINANCIAL AND LEGAL MATTERS**

TABLE OF CONTENTS	i
FOREWORD	v
EXPLANATORY NOTES	vii
INDEX OF TABLES, CHARTS AND DRAWINGS	ix
<u>CHAPTER I - INSTITUTIONAL STATUS</u>	
ARTICLE I-1 GENERAL CONSIDERATIONS	III-1
ARTICLE I-2 SUGGESTED POSSIBILITIES	III-5
ARTICLE I-3 MAIN ADVANTAGES AND DISADVANTAGES	III-6
ARTICLE I-4 SUGGESTED ASPECTS TO BE CONSIDERED IN THE IMPLEMENTATION AGREEMENT	III-7
ARTICLE I-5 ESTABLISHMENT IN THE HOST COUNTRY	III-10

	<u>Page number</u>
<u>CHAPTER II - FINANCIAL EVALUATION</u>	
ARTICLE II-1      INTRODUCTORY NOTE	III-11
ARTICLE II-2      CENTRE'S MARKET FORECAST SUMMARY	III-15
ARTICLE II-3      CENTRE'S SALES UNIT PRICES	III-15
ARTICLE II-4      CENTRE'S CAPACITIES AND MAXIMUM OVERALL SALES CAPABILITY	III-17
ARTICLE II-5      BASIS OF THE FINANCIAL STUDY	III-19
ARTICLE II-6      INVESTMENT COSTS	III-25
ARTICLE II-7      FINANCING COSTS	III-29
ARTICLE II-8      OPERATING COSTS AND WORKING CAPITAL	III-29
ARTICLE II-9      FINANCIAL EVALUATION	III-34
ARTICLE II-10     CONCLUSIONS FROM THE FINANCIAL EVALUATION	III-47
ARTICLE II-11     RECOMMENDATION	III-48
<u>EXHIBIT III-1 - COMPUTER RUNS FOR FINANCIAL ANALYSIS</u>	-
<u>EXHIBIT III-2 - FINANCING SOURCES</u>	-

## FOREWORD

UNIDO, in response to a suggestion from groups of countries in the course of the First Consultation of the Pharmaceutical Industry held at Estoril, Portugal in December 1980, considered the possibility of establishing an International Centre for Information, Training and Development of Pharmaceutical Technology, hereinafter referred to as the ITPT Centre. It was envisaged that the Centre could undertake applied research and adapt technologies on behalf of governments and industry in developing countries as well as conduct related activities such as quality control, training personnel and providing technical information.

At a follow-up meeting held in Mohammedia, Morocco, on Co-operation, UNIDO announced that the Developing Countries were interested in establishing such a Centre and would soon discuss the project with UNIDO officials. It was suggested that the proposed Centre should concentrate on process development for drugs produced by chemical synthesis and by extraction from medicinal plants. It was understood that a research centre for producing drugs, in particular antibiotics by fermentation process, would be established with UNIDO support at another location.

As result of these discussions and further investigations, the requirements for a Feasibility Study were established and so stated in a Terms of Reference. These Terms of Reference were discussed with official banking institutions and modified accordingly to include their requirements covering the economic information presentation and content. These Terms of Reference are included in Exhibit I-1 to Volume I of this Feasibility Study.

This Feasibility Study has been done, therefore, in accordance with said Terms of Reference, and designed to provide techno-economical information and findings on the needs, objectives, activities, feasibility and definition of the ITPT Centre. The study consists of three (3) volumes, which are as follows:

o Volume I - Executive Summary

This volume contains information in a condensed form about the objectives of the Centre, activities of the consultant, results of the centre's potential market survey, the centre definition and operating costs, conclusions and recommendations. Cross-references to the Volumes II and III and to the Terms of Reference are given in this volume for those points that require a deeper investigation or supporting data and details.

o Volume II - Potential Market, Activities and Description of the ITPT Centre

This volume covers in detail the potential market survey, the summarized statistics resulting from the survey, the various alternatives for the ITPT Centre facilities, its installation and equipment, its staff, implementation schedule and descriptive drawings.

EXHIBIT II-1 - contains the questionnaire issued to developing countries.

o Volume III - Financial and Legal Matters

This volume deals with the considerations and possibilities investigated for the legal situation of the ITPT Centre, and with the financial evaluations for the various alternatives proposed. Detailed cost schedules (both for investment and operating costs), income schedules, and financial evaluation factors, curves and calculations are included herein.

This study has been prepared by Foster Wheeler Iberia in accordance with the Terms of Reference and the agreements reached with the United Nations Industrial Development Organization (UNIDO). The group that performed the study, their background and activities for this study, and Foster Wheeler Iberia's background have been presented in Volume I, Chapter IV, Article IV-4, and in EXHIBIT I-2.

In general the external sources of information utilized in the preparation of this study have been:

- UNIDO Publications
- WHO Publications
- IMS Publications
- SRI Reports
- IRL Reports
- Foster Wheeler data bank
- SCRIPT and other medical and pharmaceutical publications
- ABS Publications



## EXPLANATORY NOTES

A dash (-) is used to indicate amounts that are nil or negligible.

A blank means that information is not given or is not applicable.

A slash between dates (e.g. 1982/1983) indicates a financial year.

The use of a hyphen between dates (e.g. 1980-1983) indicates the full period involved (e.g. beginning of 1980 until end of 1983).

A period (.) is used to indicate decimals.

A comma (,) is used to distinguish thousands and millions.

Percentage rates, commissions, fees, etc. are per annum, unless otherwise indicated.

References to "tons" are to metric tons.

Totals may not add up precisely because of rounding off.

In addition to common abbreviations, symbols and terms, the following abbreviations have been used in this study:

### General

TOT	Transfer of Technology
NGO	Non-governmental organization
p.a.	Per annum
LDC	Less developed country
ITPT	International Centre for Information, Training and Development of Pharmaceutical Technology
NCE	New chemical entity
OTC	Over the counter sold drugs
Bulk Drugs	Drugs used as raw materials to produce formulated finished forms
SD	Synthetic drug
MPDD	Medicinal plant derived or extracted drugs
QC	Quality control
PP	Pilot plant
n.a.	Not applicable

### Financial or Economic

LIBOR	London interbank offered rate
SIBOR	Singapore interbank offered rate
DFC	Development finance company
f.o.b.	free on board
SDR	Special drawings rights

### Organizations

UNIDO	United Nations Industrial Development Organization
EEC	European Economic Community
IFC	International Finance Corporation
IBRD	International Bank for Reconstruction and Development (World Bankd).
IDA	International Development Association
OAPEC	Organization of Arab Petroleum Exporting Countries
OPEC	Organization of Petroleum Exporting Countries
OECD	Organization for Economic Co-operation and Development
IMF	International Monetary Fund
UNCTAD	United Nations Commission on Trade and Development
UNDP	United Nations Development Programme
WHO	World Health Organization
FWM	Foster Wheeler Iberia (Consultant)

The description and classification of countries and territories in this study and the arrangement of the material do not imply the expression of any opinion whatsoever on the part of the secretariat of UNIDO or the consultant concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries, or regarding its economic system or degree of development.

Mention of company names and commercial products does not imply the endorsement of UNIDO or the consultant.

## INDEX TO TABLES, CHARTS AND DRAWINGS

Page  
number

### VOLUME I - EXECUTIVE SUMMARY

TABLE I-1	SUMMARY OF EXPECTED OVERALL REVENUES	I-24
TABLE I-2	ILLUSTRATIVE BREAKDOWN OF SERVICES	I-25
TABLE I-3	SUMMARY OF INITIAL INVESTMENT COST	I-34
TABLE I-4	SUMMARY OF OPERATING COST (Current Values)	I-35
TABLE I-5	SUMMARY OF FINANCIAL EVALUATION	I-36

### VOLUME II - POTENCIAL MARKET, ACTIVITIES AND DESCRIPTION OF THE ITPT CENTRE

METHODOLOGY DIAGRAM Nº 1	SYNTHETIC DRUGS	II-5
METHODOLOGY DIAGRAM Nº 2	MEDICINAL PLANT DERIVED DRUGS	II-6
METHODOLOGY DIAGRAM Nº 3	FORMULATION AND PACKAGING PILOT PLANTS	II-7
METHODOLOGY DIAGRAM Nº 4	ANALYTICAL AND QUALITY CONTROL UNIT	II-8
METHODOLOGY DIAGRAM Nº 5	TRAINING SERVICES	II-9
METHODOLOGY DIAGRAM Nº 6	ENGINEERING AND ADVISORY SERVICES	II-10
TABLE II-1-A	SUMMARY OF ESSENTIAL DRUGS CLASSIFIED BY THERAPEUTIC GROUPS	II-13
TABLE II-1-B	RAW MATERIALS AND INTERMEDIATES REQUIRED TO PRODUCE ESSENTIAL DRUGS	II-17
TABLE II-1-C	CONSUMPTION OF PHARMACEUTICAL PRODUCTS IN THE WORLD	II-23

		<u>Page number</u>
TABLE II-1-D	CONSUMPTION OF PHARMACEUTICAL PRODUCTS IN SELECTED DEVELOPING COUNTRIES	II-24
TABLE II-1E	CONSUMPTION OF PHARMACEUTICAL PRODUCTS BY THERAPEUTIC GROUPS	II-23
TABLE II-II	PREVAILING DISEASE PATTERN IN DEVELOPING COUNTRIES (By Regions)	II-25
TABLE II-III-A	TOTAL POPULATION INCREASE & AVERAGE ANNUAL GROWTH RATES FOR DEVELOPING COUNTRIES TO YEAR 2000	II-26
TABLE II-III-B	SOCIO- ECONOMIC PROFILE IN SELECTED DEVELOPING COUNTRIES	II-27
TABLE II-IV	ESSENTIAL DRUGS REQUIRED IN DEVELOPING COUNTRIES IN RELATION WITH PREVAILING DISEASES	II-30
TABLE II-V	PHARMACEUTICAL INDUSTRY PROFILE IN SELECTED DEVELOPING COUNTRIES	II-31
TABLE II-VI	SELECTED DRUGS REQUIRED AND WHICH HAVE A POTENTIAL TO BE PRODUCED IN DEVELOPING COUNTRIES	II-35
TABLE II-VII	RAW MATERIALS AND INTERMEDIATES REQUIRED TO PRODUCE ESSENTIAL DRUGS WITH TOP PRIORITY	II-36
TABLE II-VIII-A	AVAILABLE TECHNOLOGIES TO PRODUCE SELECTED ESSENTIAL DRUGS WHICH SHOULD HAVE PRIORITY. PATENT STATUS AND SOURCES	II-37
TABLE II-VIII-B	ILLUSTRATIVE USAGE OF OPERATING PROCESSES BY THERAPEUTIC GROUPS	II-38
TABLE II-IX-A	MEDICINAL PLANTS AVAILABLE IN DEVELOPING COUNTRIES AND THEIR ACTIVE SUBSTANCES BY THERAPEUTIC GROUPS. QUALITATIVE MARKET STATUS AND TREND	II-44
TABLE II-IX-B	DEVELOPING COUNTRIES MEDICINAL PLANT MATERIAL EXPORTS TO THE E.E.C. AND THE U.S.A.	II-48

		<u>Page number</u>
TABLE II-X	MEDICINAL PLANT DRUGS SUITABLE AND RECOMMENDED FOR PRODUCTION BY DEVELOPING COUNTRIES	II-49
TABLE II-XI	TECHNOLOGIES REQUIRED TO PRODUCE RECOMMENDED MEDICINAL PLANT DERIVED DRUGS. PATENT STATUS	II-50
TABLE II-XII-A	SELECTED ESSENTIAL DRUGS SUITABLE TO BE PURCHASED IN BULK FORM	II-52
TABLE II-XII-C	DIFFERENT TYPES OF FORMULATIONS	II-52
TABLE II-XII-B	ANCILLARY PRODUCTS REQUIRED TO FORMULATE DRUGS	II-53
TABLE II-XIII	RELATIVE IMPORTANCE OF DEVELOPED AND DEVELOPING COUNTRIES AS DRUG MARKETS	II-54
-----	ORGANIZATION CHART	II-65
TABLE II-XIV	DETAILED BREAKDOWN OF THE STAFF FOR THE VARIOUS ALTERNATES	II-66/67
SCHEDULE II-1	CONSTRUCTION SCHEDULE	II-112
SCHEDULE II-2	SCHEDULE FOR START OF ACTIVITIES	II-113
DRAWING 6012-A1-4701	GENERAL PERSPECTIVE	-
DRAWING 6012-A1-4702	ELEVATION	-
DRAWING 6012-A1-4703	SECOND BASEMENT	-
DRAWING 6012-A1-4704	FIRST BASEMENT	-
DRAWING 6012-A1-4705	GROUND FLOOR	-
DRAWING 6012-A1-4706	FIRST FLOOR	-
DRAWING 6012-A1-4707	SECOND FLOOR	-
DRAWING 6012-A1-4708	THIRD FLOOR	-

VOLUME III - FINANCIAL AND LEGAL MATTERS

TABLE III-1	UNIT SALES PRICES COMPARISON	III-16
TABLE III-2	ILLUSTRATIVE EXAMPLE FOR AVERAGE OR STANDARD SALE PRICES OF SERVICES	III-16
TABLE III-3	ITPT CENTRE OVERALL SALES CAPABILITY	III-20
SCHEDULE III-I-A	ESTIMATE OF INVESTMENT COST: PRE-IMPLEMENTATION CAPITAL EXPENDITURES	III-26
SCHEDULE III-I-B	ESTIMATE OF INVESTMENT COST: FIXED INVESTMENT COST	III-27
SCHEDULE III-I-C	SUMMARY SHEET. TOTAL INITIAL INVESTMENT COST	III-28
SCHEDULE III-2-A	ESTIMATE OF INDUSTRIAL COST	III-30/31/32
SCHEDULE III-2-B	WORKING CAPITAL DEFINITION	III-33
SCHEDULE III-3-A/B	BALANCE SHEETS (Base Case A and Alternate 3)	III-40/41
SCHEDULE III-4	SUMMARY OF EVALUATION RESULTS (Sensitivity Analysis)	III-42
CHARTS III-1-A/B	SENSITIVITY ANALYSIS TO INTEREST RATE (Base Case A and Alternate 3)	III-44/45
CHARTS III-2-A/B	SENSITIVITY ANALYSIS TO SALES, SALARIES AND INVESTMENT (Base Case A and Alternate 3)	III-44/45
CHARTS III-3-A/B	BREAK-EVEN POINT (Base Case A and Alternate 3)	III-46

CENTRE'S POTENTIAL MARKET SURVEYI-1 INTRODUCTION

In compliance with the requirements of point 3 of the Terms of Reference, a market survey has been carried out to determine the potential market that the ITPT Centre could expect in order to define whether this market exists or not, the market size, the size and capabilities of the Centre, and to estimate the revenues that the ITPT Centre could obtain for the rendering of its services. Furthermore, financial viability of the ITPT Centre has been investigated based on the criteria, already stated in the Terms of Reference and in Volume I of this Feasibility Study, that the ITPT Centre will be a non-profit institution. The financial study will also indicate the possibilities for the Centre to become economically self-sufficient in the medium term.

Because of the special nature of the ITPT Centre, a special methodology has been developed to perform the market survey. To facilitate the reading of this chapter, the methodology followed has been summarized in several charts called Methodology Diagrams, numbered 1 to 6, which are included in article I-2 of this chapter.

These diagrams represent in graphic form the concepts and type of data utilized, and the logical procedures and linkages followed, to arrive to the Centre's market forecast. Although the diagrams are essentially self-explanatory, a brief description is given hereby of the methodology followed.

I-2 METHODOLOGYA. Synthetic Drugs

This procedure can be visualized in Methodology Diagram nº. 1. and responds to points 3.1, 3.2 and 3.4 of the Terms of Reference.

The pharmaceutical market size and trends in developing countries has been investigated to obtain information regarding consumption and needs for drugs and, therefore, the possibilities of new industries which could be installed in developing countries to fulfill the actual and future needs. This has been summarized in Tables II-I-A to II-I-D. Consequently, qualitative information can be obtained for quality control requirements (actual and future), technical assistance, transfer of technology, and at a later stage, personnel training and education requirements in connection with the pharmaceutical industry.

A study of the pharmaceutical and socio-economical profiles of developing countries and their disease patterns has been performed, as this

influences the market size and behaviour, especially because of population growth rates and of the health care status and trends. The results have been summarized in Tables II-II and II-III A/B.

From the above, a list of the essential drugs required by developing countries in connection with the prevailing disease patterns has been prepared. The list has been organized by therapeutic groups as shown in Table II-IV. The purpose of this Table II-IV is to summarize which drugs would be required to improve the health situation in developing countries and whose local manufacture will be of great help to improve the economics of health and to approach self-sufficiency in essential pharmaceuticals.

This Table II-IV has been compared with the recommendations of the UNIDO Second Panel Meeting of Experts of the Pharmaceutical Industry (Vienna), (1), for the list of recommended drugs which should be produced in developing countries and the expanded list issued in collaboration with WHO in 1983, (2).

To supplement this Table, the raw materials and intermediates required to produce these drugs have been summarized in Table II-VII. In connection with these selected drugs, Table II-VIII has been prepared showing the technologies available to produce these drugs, their patent status and the sources of such technologies. The purpose of Tables II-VI, II-VII and II-VIII is to investigate the possibilities for transfer of technology and to define the priorities for the ITPT Centre for applied research, engineering and advisory services.

This programme should be finalized utilizing the conclusions obtained from the profiles about existing and planned or required pharmaceutical production facilities and with the "interest factor" resulting from the answers to the questionnaire sent to developing countries, to obtain the market forecast for the ITPT Centre services in this field (applied research and advisory services). The associated formulation and packaging components that could produce these activities, have also been indicated. As mentioned in Volume I, Chapter I, article I-7, the answers to the questionnaire to date have been insufficient to establish the "interest factor" at this time and therefore, the market forecast figures have been estimated based on all the other information compiled in this study to permit the developing of the financial calculations. Therefore, prior to implementation of the Centre, the financial analysis should be recalculated using "committed" values from member countries for the revenues.

The above situation applies to all and each of the sectors of this market survey.

#### B. Medicinal Plant Derived Drugs

This procedure has been visualized in Methodology Diagram n<sup>o</sup>. 2. and responds to points 3.3 and 3.4 of the Terms of Reference.

(1) UNIDO Publication ID/WG- 267/4

(2) WHO Publication, Technical Report Series n<sup>o</sup> 685, (Geneve, 1983)



To obtain an overall view of the medicinal plants and medicinal plant derived drug market situation, the most relevant data has been summarized in Table II-IX. Some considerations and conclusions have been drawn from it to assess how these drugs could complement and/or supplement the therapeutics with synthetic drugs. From the above, a list of medicinal plants and active substances which are suitable and recommended for production in developing countries has been presented in Table II-X. An analysis of the patent situation has been made and the summary of technologies available and/or required (and therefore to be developed) to obtain the recommended active substances, has been presented in Table II-XI.

Bearing in mind the pharmaceutical and socio-economic profiles mentioned in the Methodology Diagram nº. 1 (Tables II-III and II-V) and the technologies existing and required in the future. As a result of the above, the program for the activities of the ITPT in this sector has been established under the same conditions as stated in the former paragraph. The market forecast (applied research and advisory services component nº 2) for the ITPT Centre has also been outlined. The component of formulation and packaging workload that these activities could produce for Alternate 3, has also been highlighted.

### C. Formulation and Packaging

This subject has been dealt with in Methodology Diagram nº. 3, and is a consequence of the response to points 3.2 and 3.3 of the Terms of Reference.

To obtain information about the advantages of formulating and packaging drugs in developing countries, a summary has been presented in Table II-XII which shows the quantity of drugs and intermediates in developing countries which are normally purchased in bulk form, those which are suitable to be purchased in bulk and those that require special packaging because of climatic conditions.

This table has been prepared from the data in Table II-I, in Methodology Diagram nº 1. Technologies required, their patent status and possibilities for transfer have also been analysed in Table II-XIII. Existing and planned formulation and packaging facilities in developing countries have also been analyzed. With all of the above data the ITPT Centre's programme for formulation and packaging research and for special packaging research has been defined.

Taking into account the conditions stated above (points A and B) a market forecast for the ITPT Centre has been outlined. The market forecast for formulation and packaging has been split into five subsectors:

1. - Formulation and packaging applied research.
2. - Formulation and packaging production services.
3. - Special packaging applied research.
4. - Special packaging production services.
5. - Engineering and advisory services for the above (component nº. 3).

The formulation and packaging components derived from the activities of the ITPT Centre in the synthetic drugs and medicinal plant derived drugs

sectors have been considered in the corresponding subsectors (1 and 3). However they have not been accounted for in the evaluation of subsectors 4 and 5.

D. Quality Control

This procedure can be visualized in the Methodology Diagram nº. 4. and responds to point 4-b-iii of the Terms of Reference.

The subject of quality control in the pharmaceutical industry has been discussed in Volume I of this Study (Chapter I, Article I-4). Quality control requirements apply to all drugs, raw materials and intermediates used and not only to those that could be directly investigated by the ITPT Centre. It is also recognized that uniform and extensive quality control procedures and facilities are lacking in most of the developing countries. The ITPT Centre Quality Control Unit could carry on most of the quality tests required for any drug imported into or produced by developing countries. Therefore the overall drug market has been considered.

Available data does not give enough information on the number of lots of products nor total quantities. Therefore dollar value figures have been used, calculating the equivalent average number of lots. Normally three tests per lot are required for each quality control test and from the resulting figure the estimated number of tests per laboratory have been established. Conservative factors have been used to arrive to the ITPT Centre sales figures. These factors are explained in the following pages.

E. Training services

This procedure is visualized in Methodology Diagram nº. 5. The procedure responds to point 3.5-h of the Terms of Reference.

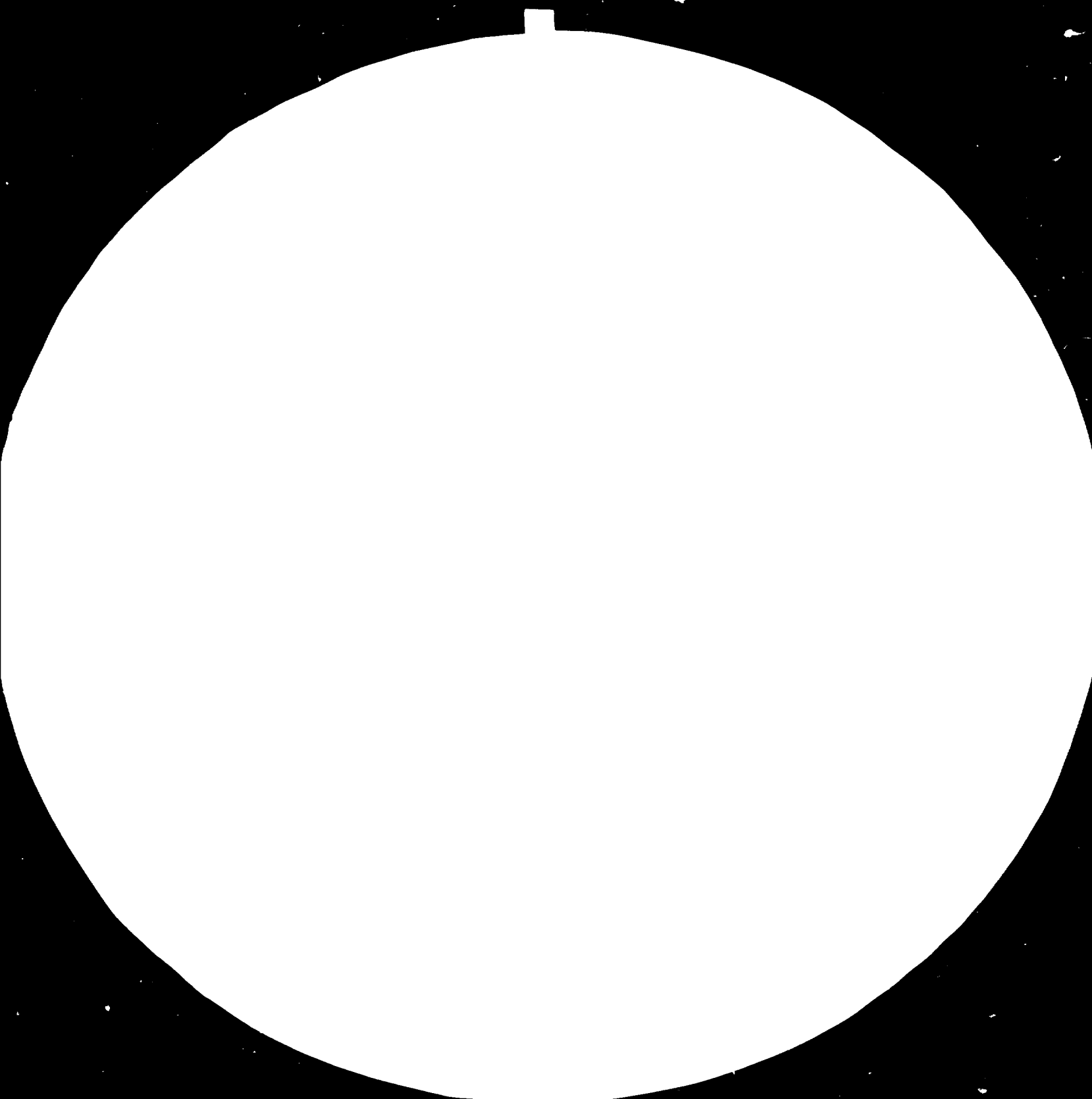
From the socio-economical and pharmaceutical profiles and the expected expansion of the pharmaceutical industry in developing countries, in Methodology Diagrams nºs. 1, 2 and 3, the potential training demand has been established and adjusted taking into account the conditions indicated in paragraph A, to outline the Centre's potential sales in this field.

F. Engineering and Advisory Services

This procedure can be visualized in Methodology Diagram nº. 6. and responds to point 3.5 a,b,e,d,f and g of the Terms of Reference.

The engineering and advisory services potential market for the ITPT Centre is the sum of the three components obtained in the Methodology Diagrams nº. 1, 2 and 3. These figures have to be adjusted for the age and characteristics of the existing facilities, and the plans for future expansion and new installations.

The amount of advisory services (rationalization and feasibility studies) that the Centre could sell will be much higher than the amount of engineering projects, as not all the feasibility studies will lead to the implementation of a new project, and in many instances the affected countries may wish to do the engineering work themselves or may wish to utilize other entities.





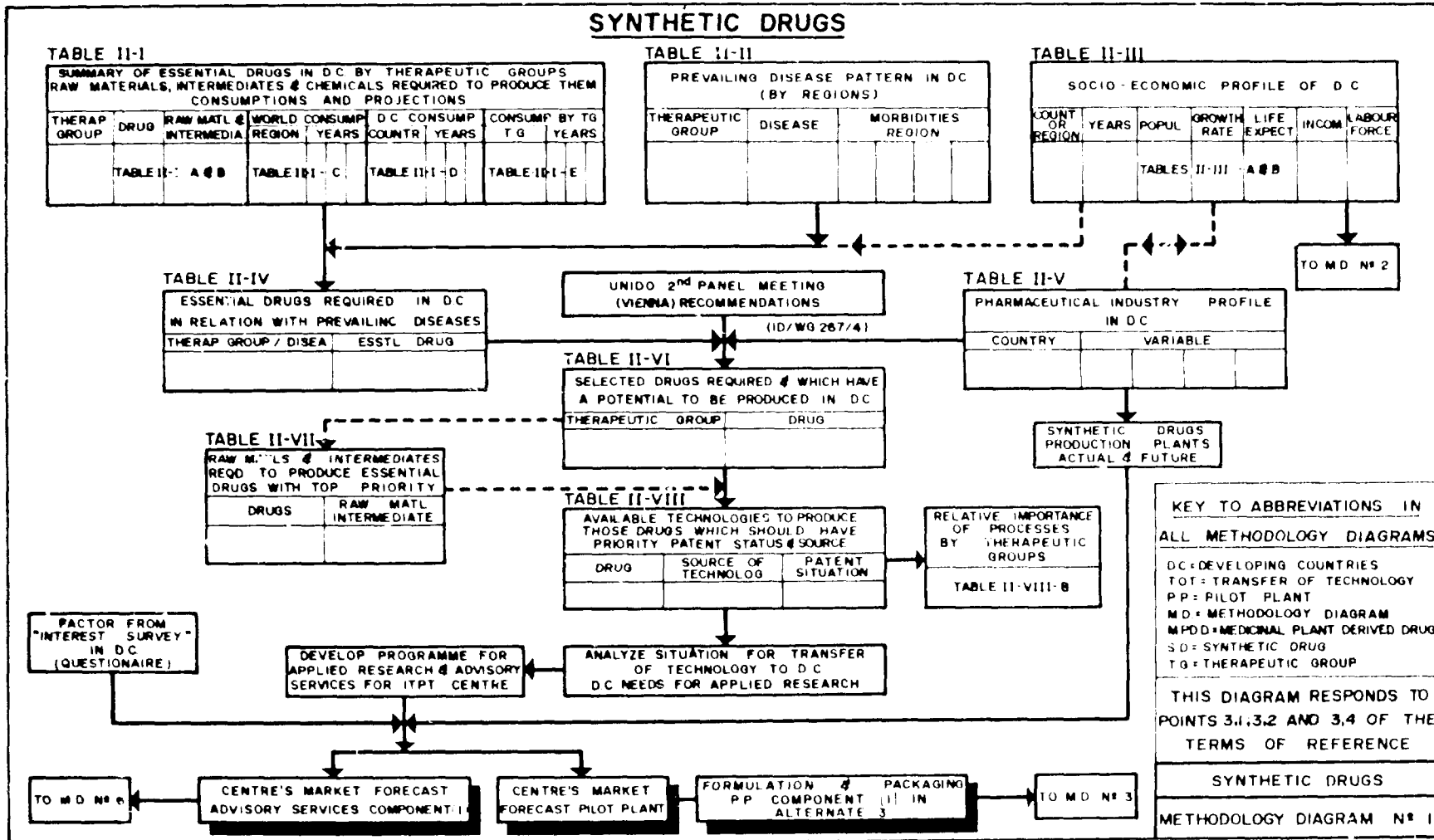
2.5

2.2

2.0



Resolution Test Chart  
This chart is used to measure the resolution of a system. The numbers represent the spatial frequency in cycles per inch. The chart is composed of a series of vertical and horizontal lines of varying thicknesses and spacings. The resolution is determined by the smallest number of lines that can be distinguished as separate entities.



**KEY TO ABBREVIATIONS IN ALL METHODOLOGY DIAGRAMS**

DC=DEVELOPING COUNTRIES  
TOT=TRANSFER OF TECHNOLOGY  
PP=PILOT PLANT  
MD=METHODOLOGY DIAGRAM  
MPDD=MEDICINAL PLANT DERIVED DRUG  
SD=SYNTHETIC DRUG  
TG=THERAPEUTIC GROUP

THIS DIAGRAM RESPONDS TO POINTS 3.1, 3.2 AND 3.4 OF THE TERMS OF REFERENCE

**SYNTHETIC DRUGS**

METHODOLOGY DIAGRAM N° 1

### MEDICINAL PLANT DERIVED DRUGS

TABLES II-IX - A & B

MEDICINAL PLANTS AVAILABLE IN DEVELOPING COUNTRIES (PER REGION) AND ACTIVE SUBSTANCES BY THERAPEUTIC GROUPS QUALITATIVE MARKET STATUS & TRENDS							
THERAPEUTIC GROUP	PLANT	PART OF PLANT USED	ACTIVE SUBSTANCE	AVAILABILITY FORM	ACTIVE SUBSTAN PRODUCT METHOD	MARKET PROFILE	MARKET TREND

ASSESSMENT OF HOW THESE DRUGS CAN SUPPLEMENT THE THERAPY WITH SYNTHETIC DRUGS

TABLE II-X  
MEDICINAL PLANT DERIVED DRUGS SUITABLE AND RECOMMENDED FOR PRODUCTION IN DEVELOPING COUNTRIES (BY TO)

TABLE II-XI  
TECHNOLOGY REQUIRED TO PRODUCE THESE DRUGS TECHNOLOGY PATENT STATUS TECHNOLOGY TO BE DEVELOPED AND/OR ADAPTED

ANALYSIS OF PATENT STATUS FOR THESE DRUGS

FROM MDT (SOCIO-ECONOM & PHARM PROFILES)

EXISTING & PLANNED M.P.D.D. PRODUCTION PLANTS

PROGRAMME FOR M.P.D.D. APPLIED RESEARCH (PILOT PLANT) ADVISORY SERVICES & TOT ASSISTANCE IN M.P.D.D.

"INTEREST FACTOR" IN MPDD IN DC (FROM QUESTIONNAIRE)

FORMULATION & PACKAGING P.P. COMPONENT (2) IN ALTERNATE 3

ITPT'S MARKET FORECAST FOR MPDDU PILOT PLANT

ITPT'S MARKET FORECAST FOR MPDD ADVISORY & ENGINEERING SERVICES COMPONENT (2)

TO MD No 6

TO MD No 3

REFER TO "KEY" IN METHODOLOGY DIAGRAM No 1 FOR ABBREVIATIONS

THIS DIAGRAM RESPONDS TO POINTS 3.3 & 3.4 OF THE TERMS OF REFERENCE

MEDICINAL PLANT DERIVED DRUGS

METHODOLOGY DIAGRAM No 2

## FORMULATION AND PACKAGING PILOT PLANTS

**TABLE II-XII**

DRUGS & INTERMEDIATES PURCHASED BY DC (SD & MPD) TRADE DATA & PROJECTIONS WITH INDICATION OF THOSE SUITABLE TO BE PURCHASED IN BULK AND THOSE REQUIRING SPECIAL PACKAGING FOR TROPICAL OR HUMID CLIMATES					
DRUG OR INTERMEDIATE	MARKET VOLUM & PROJECT	PURCHASED IN BULK	SUITABLE TO BE PURCH IN BULK	REQUIRING SPECIAL PACKAG	TYPES OF FORMULATIONS
REFER TO TABLES-II-I-B,C & D			TABLE-II-XII-A		TABLE-II-XII-C

FROM MD N°1  
DRUGS MARKET  
TABLE-II-I

FROM MD N°1  
SOCIO-ECONOMIC  
& PHARMACEUTICAL  
PROFILES

EXISTING & PLANNED  
FORMULATION &  
PACKAGING PLANTS  
IN DC

TECHNOLOGY REQUIREMENTS TO FORMULATE  
AND PACKAGE THESE DRUGS  
PATENT STATUS TOT SITUATION  
TECHNOLOGIES TO BE DEVELOPED

FROM MD 1 & 2  
COMPONENTS (1) & (2)  
IN ALTERNATE 3

ITPT'S PROGRAMME  
FOR FORM & PACKAGING  
PILOT PLANT  
BASE CASE & ALTERN 3

ITPT'S PROGRAMME  
FOR PACKAGING  
PILOT PLANT  
BASE CASE & ALTERN 3

"INTEREST FACTOR"  
IN DC  
FROM QUESTIONNAIRE

ITPT MARKET FORECAST  
FORMULATION & PACKAGING  
APPLIED RESEARCH

ITPT MARKET FORECAST  
FORMULATION & PACKAGING  
PRODUCTION SERVICE

ITPT MARKET FORECAST  
ENGINEERING & ADVISORY  
SERVICES (FORMULATION &  
PACKAGING)  
COMPONENT (3)

ITPT MARKET FORECAST  
PACKAGING  
APPLIED RESEARCH

ITPT MARKET FORECAST  
PACKAGING  
PRODUCTION SERVICES

FOR BASE CASE OR ALT 3

FOR BASE CASE OR ALT 3

TO MD N° 6

FOR BASE CASE & ALT 3

FOR BASE CASE & ALT 3

REFER TO "KEY" IN METHODOLOGY  
DIAGRAM N°1 FOR ABBREVIATIONS

THIS DIAGRAM RESPONDS TO  
POINTS 3.2 & 3.3 OF THE  
TERMS OF REFERENCE

FORMULATION AND PACKAGING  
PILOT PLANTS

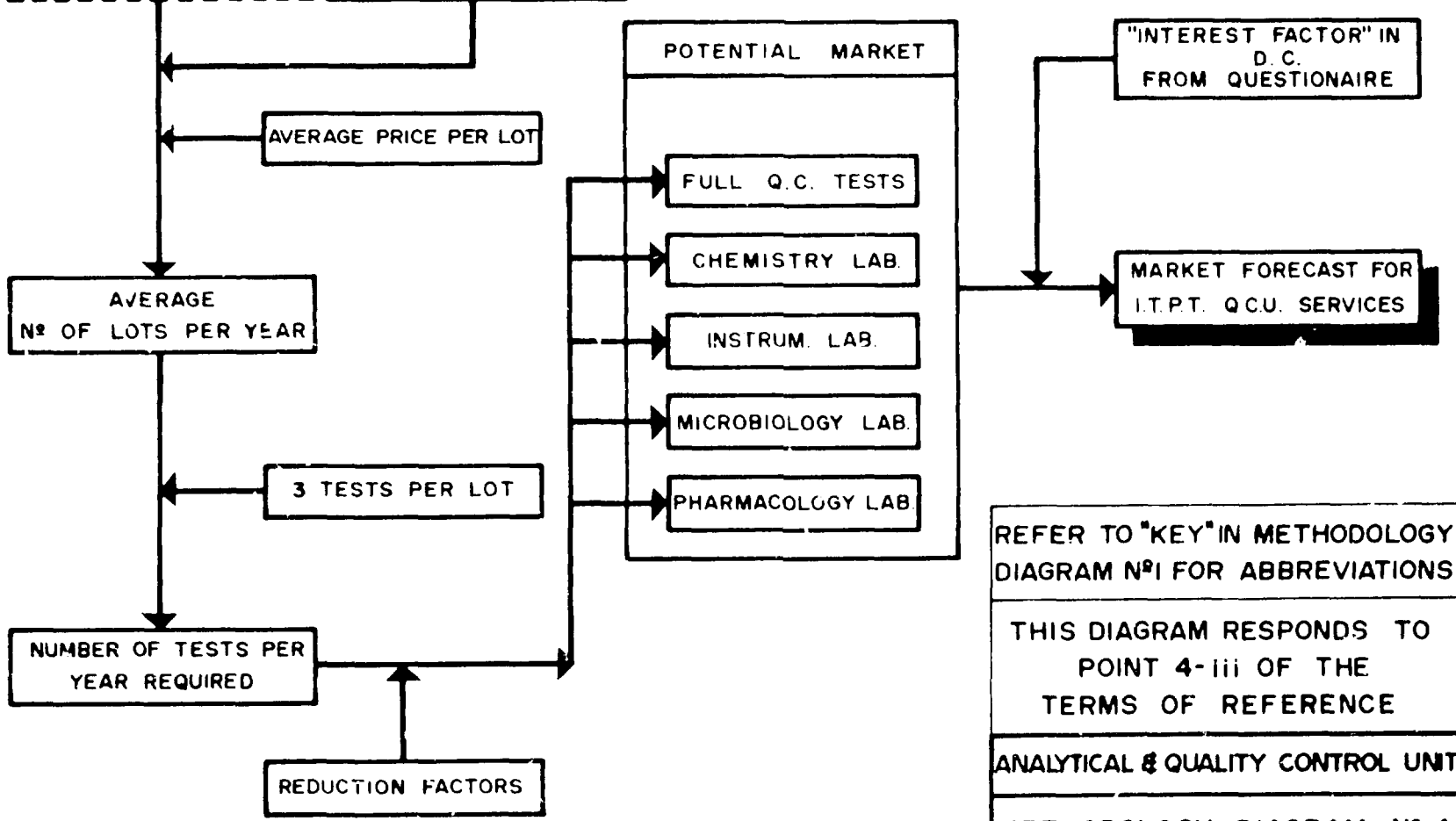
METHODOLOGY DIAGRAM N° 3

# ANALYTICAL & QUALITY CONTROL UNIT

TABLE-II-XIII

FROM M.D. 1,2&3  
DRUGS MARKET VOLUME  
& PROJECTIONS IN D.C.

RELATIVE IMPORTANCE  
OF D.C. AS DRUG  
MARKETS & PROJECTIONS



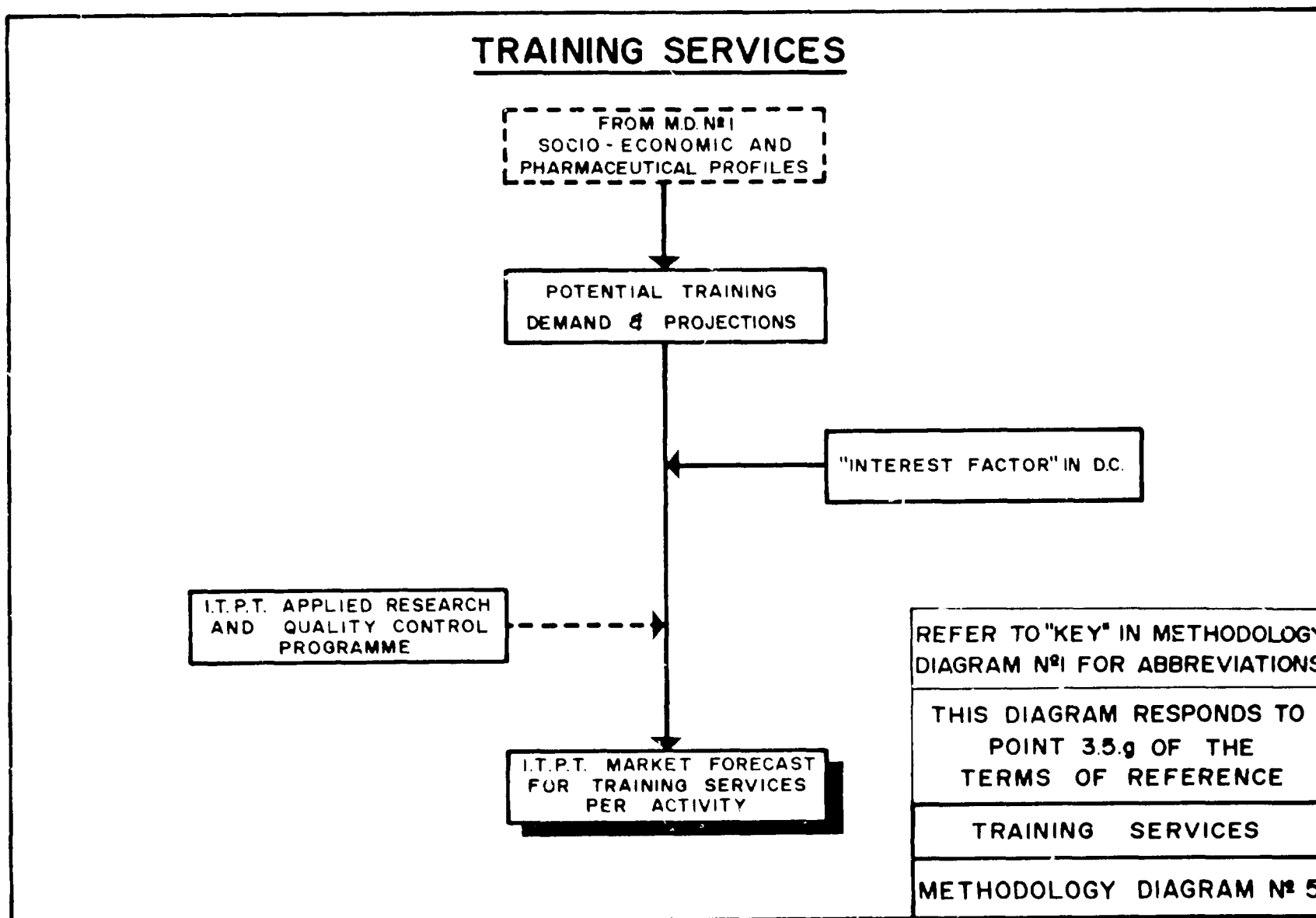
REFER TO "KEY" IN METHODOLOGY  
DIAGRAM Nº 1 FOR ABBREVIATIONS

THIS DIAGRAM RESPONDS TO  
POINT 4-iii OF THE  
TERMS OF REFERENCE

ANALYTICAL & QUALITY CONTROL UNIT

METHODOLOGY DIAGRAM Nº 4





## ENGINEERING & ADVISORY SERVICES



REFER TO "KEY" IN METHODOLOGY  
DIAGRAM №1 FOR ABBREVIATIONS

THIS DIAGRAM RESPONDS TO  
POINT 3.5 & 4 OF THE  
TERMS OF REFERENCE

ENGINEERING & ADVISORY SERVICES

METHODOLOGY DIAGRAM № 6

I-3 SUMMARIZED STATISTICS FOR THE MARKET SURVEY

The article responds to point 3 of the Terms of Reference.

A. Synthetic Drugs (Note 1)

The following statistics have been organized and numbered in the same sequence as explained in paragraph I-2, "Methodology", and in the corresponding Methodology Diagram n<sup>o</sup>. 1. They have been included all together at the end of this paragraph.

Table II-I-A summarizes the essential drugs most frequently used in developing countries, arranged by therapeutic groups.

Table II-I-B summarizes the raw materials and intermediates required to produce these drugs.

*These tables have been prepared to be used as starting points for the market study, focusing attention on those drugs whose production could be given priority. The tables also summarize those drugs and raw materials whose availability should be sought or promoted in developing countries. The ITPT Centre's initial activities should be dedicated to some of these drugs.*

These tables should be used together with Table II-II (Prevailing Disease Patterns in Developing Countries) and Tables II-III A and B (Socio-economic Profile in Developing Countries) to obtain a list of those drugs which are really mostly needed in developing countries.

Tables II-I-C to II-I-E provide information on the drug market size in developing countries and will be used as starting points to define the quality control and formulation and packaging services market size for the ITPT Centre.

The above mentioned tables will also be starting points to investigate the Centre's potential market in the sector of medicinal plant drugs, formulation and packaging and training.

The tables have been arranged in such a way as to provide also a general picture of the importance of the pharmaceutical drug market in the developing countries.

The growth in population of the world reflects the demand for pharmaceuticals, and this can be forecasted for some considerable period with a reasonable degree of accuracy. The United Nations has collected data on world population trends over a long period and this can be used to make forecasts of the world population up to the end of the present century, as indicated below:

Note 1- Specifically fulfils the requirements of points 3.1 and 3.2 of the Terms of Reference.

WORLD POPULATION FORECASTS TO THE YEAR 2000 (1)

YEAR	(Millions)		TOTAL	%LDR
	DEVELOPED REGIONS	LESS DEVELOPED REGIONS (LDR)		
1975	1093.2	2940.0	4033.2	72.89
1980	1130.7	3284.0	4414.7	74.39
1985	1168.9	3660.9	4629.8	75.80
1990	1265.8	4069.5	5275.3	77.14
1995	1239.9	4493.2	5733.1	78.37
2000	1272.3	4926.3	6198.6	79.47

The growth in importance of the less developed countries in terms of population over this period is readily seen. A more detailed projection for population increase over the years ahead is given in Table II-III-A for each of the major less developed regions up to the year 2000. Together with Table II-III-B "Socio-economic profile" this data reveals the big increase in pharmaceutical consumption that is expected in these regions, and justifies the need to install new production plants in developing countries aimed at approaching self-sufficiency and at reducing foreign exchange deficits. Table II-IV is an extract of the previous data focusing more closely on those drugs whose production in developing countries should be considered in detail.

Analyzing Tables II-IV and II-V, the recommendations of the UNIDO Second Panel Meeting of Experts of the Pharmaceutical Industry, Vienna, (2) and the revised list of recommended drugs suitable to be produced in developing countries (developed by UNIDO in coordination with WHO (3)), Table II-VI, lists the drugs that have a potential and have priority for production in the developing world. Table II-VII presents, as supplementary information, those raw materials required to produce these drugs for the same purpose as in Table II-I-B.

It is necessary now to analyze the technologies available to be adapted or developed to produce these drugs in developing countries, their patent status, sources and the possibilities for transfer to this group of countries. This data has been summarized in Table II-VIII-A. Table II-VIII-B shows the relative importance of specific processes in the production of drugs, classified by therapeutic groups. It is helpful to define priorities when developing the program for applied research activities of the ITPT Centre.

Once the possibilities for transfer of technology and the pharmaceutical industry profile and trends are analyzed, the programme of activities in this sector can be developed, and the potential market for the ITPT Centre in synthetic drugs applied research and engineering services established. The programme and the market forecast have been summarized respectively in article 1-4 within this chapter, and in Article II-2 of Volume III.

(1) IRL., Report "Opportunities for Pharmaceuticals in the Developing World over the next twenty years"; London, 1980.

(2) UNIDO Publications ID/WG-267/4/5

(3) WHO Publication "The Use of Essential Drugs", Technical Report Series n° 685 (Geneve, 1983).

TABLE II-I-A

SUMMARY OF ESSENTIAL DRUGS CLASSIFIED BY THERAPEUTIC GROUPS				
THERAPEUTIC GROUP	DRUG	THERAPEUTIC GROUP	DRUG	
<u>ANALGESIC, ANTIFEVERIC, ANTI-INFLAMMATORY AGENTS</u>	Acetylsalicylic acid	<u>ANTIINFECTIVE DRUGS</u> (Cont.)		
	Allopurinol			
	Ibuprofen		<u>Antileprotic drugs</u>	Dapsone
	Indometacin			
	Paracetamol		<u>Antimicrobics</u>	Amphotericin B Griseofulvin Flucytosine
<u>NARCOTICS AND NARCOTIC ANTAGONIST</u>	Colchicine			
	Morphine			
	Naloxone	<u>Antituberculosis drugs</u>	Isoniazid Ethambutol Thioacetazone Rifampicin	
<u>ANAESTHETICS</u>	Pethidine			
	Ether, anaesthetic			
	Halothane			
	Nitrous oxide	<u>Antibacterial drugs</u>	Ampicillin Penicillin-G Benzathine Penicillin-G Phenoxymethyl penicillin Chloramphenicol Cloxacillin Erythromycin Gentamicin Salazosulfapyridine Sulfadimidine Sulfamethoxazole Trimethoprim Tetracycline	
	Thiopental sodium			
	Bupivacaine			
<u>ANTI-HISTAMINIC</u>	Lidocaine			
	Chlorphenamine			
<u>ANTI-DOTES, CHELATING AGENTS</u>	Atropine			
	Calcium disodium edetate	<u>Antiamebiasis</u>	Metronidazol Diloxanide Emetine Paranomycin	
	Charcoal, activated			
	Dimercaprol			
	Pralidoxime	<u>Schistosomicides</u>	Metrifonate Niridazole Oxamniquine Etiopiridate	
<u>DRUGS ACTING ON THE NERVOUS SYSTEM</u>	Diazepam			
	Ethosuximide			
	Phenytoin	<u>Antileishmaniasis</u>	Sodium stibogluconate Pentamidine	
	Phenobarbitone			
	Carbamazepine			
<u>ANTIINFECTIVE DRUGS</u>				
<u>Antifilarial drugs</u>	Diethyl carbamazine Suramin			
<u>Anthelmintics</u>				
	Mebendazole			
	Piperazine and salts			
	Niclosamide			
	Bephenium			
Thiabendazole				
Tetrachloroethylene				

TABLE - II - I - A (Cont.)

SUMMARY OF ESSENTIAL DRUGS CLASSIFIED BY THERAPEUTIC GROUPS			
THERAPEUTIC GROUP	DRUG	THERAPEUTIC GROUP	DRUG
<u>ANTIINFECTIVE DRUGS</u> (Cont.)		<u>CARDIOVASCULAR DRUGS</u> (Cont.)	
<u>Antimalarials</u>	Chloroquine Primaquine Pyrimethamine Quinine Amodiaquine Sulfadoxine	<u>Antihypertensive</u>	Diazoxide injection Guanethidine Hydralazine Hydrochlorothiazide Propranolol Phentolamine Methyldopa Reserpine
<u>Antitrypanosomals</u>	Melarsoprol Nifurtimox Pentamidine Suramin	<u>Cardiac glycosides</u>	Digoxin Digitoxin
<u>ANTINEOPLASTICS</u>	Busulfan Chlormethine Cyclophosphamide Doxorubicin Fluorouracil Methotrexate Vincristine	<u>Drugs used in shock</u>	Dopamine Isoprenaline injection
<u>ANTIMIGRAINE</u>	Ergotamine	<u>GASTROINTESTINAL DRUGS</u>	
<u>ANTIPARKINSONISM DRUGS</u>	Levodopa Trihexyphenidyl	<u>Antiacids</u>	Aluminium hydroxide Magnesium hydroxide
<u>CARDIOVASCULAR DRUGS</u>		<u>Antiemetics</u>	Promethazine
<u>Antianginal</u>	Glyceryl trinitrate Isosorbide dinitrate Propranolol	<u>Antihaemorrhoidals</u>	Local anaesthetic, astringent and antiinflammatory drug
<u>Antiarrhythmic</u>	Lidocaine Procainamide Propranolol Quinidine	<u>Antispasmodics</u>	Atropine
		<u>Cathartics</u>	Senna
		<u>Diarroea</u>	Codeine Oral rehydration salts
		<u>RESPIRATORY TRACT</u>	
		<u>Antiasmatic</u>	Aminophylline Epinephrine Salbutamol Ephedrine

TABLE II-I-A (Cont.)

SUMMARY OF ESSENTIAL DRUGS CLASSIFIED BY THERAPEUTIC GROUPS			
THERAPEUTIC GROUP	DRUG	THERAPEUTIC GROUP	DRUG
<u>RESPIRATORY TRACT</u> (Cont.)		<u>BLOOD AND HAEMATOPOIETIC</u> <u>DRUGS</u>	
<u>Antitussives</u>	Codeine	<u>Antianemics</u>	Cyanocobalamin Folic acid Ferrous salt Ferrum Dextran inject.
<u>DERMATOLOGICAL PREPARATIONS</u>		<u>Anticoagulants and</u> <u>antagonist</u>	Heparin Phythomenadione Protamine Sulfate Warfarin
<u>Antiinfective</u>	Iodine Neomicin + Bacitracin	<u>Plasma substitute</u>	Dextran 40
<u>Antiinflammatory</u>	Betamethasone Hydrocortisone	<u>PSYCHOTHERAPEUTICS</u>	Amitriptyline Chlorpromazine Diazepam Fluphenazine decanoate Haloperidol Lithium Carbonate
<u>Astringents</u>	Aluminium acetate	<u>OXITOCICS</u>	Ergometrine Oxytocin
<u>Fungicides</u>	Miconazole Nystatin	<u>OPHTHALMOLOGICAL PRE-</u> <u>PARATIONS</u>	
<u>Keratoplastics</u>	Benzoic acid + Salicylic acid Coal tar Podophyline	<u>Antiinfective</u>	Silver nitrate Sulfacetamide Tetracycline
<u>Scabicides and pediculicides</u>	Gamma benzene hexachloride Benzylbenzoate	<u>Antiinflammatory</u>	Hydrocortisone
<u>DIURETICS</u>	Furosemide Hydrochlorothiazide Mannitol Spironolactone Chlorthalidone	<u>Local anaesthetics</u>	Tetracaine
<u>MUSCLE RELAXANTS AND</u> <u>ANTAGONIST</u>	Neostigmine Suxamethonium Tubocurarine Pyridostigmine	<u>Miotics</u>	Pilocarpine
		<u>Systemic</u>	Acetazolamide

TABLE II-I-A (Cont.)

SUMMARY OF ESSENTIAL DRUGS CLASSIFIED BY THERAPEUTIC GROUPS			
THERAPEUTIC GROUP	DRUG	THERAPEUTIC GROUP	DRUG
<u>IMMUNOLOGICALS</u>		<u>HORMONES (Cont.)</u>	
<u>Sera and immuno-globulins</u>	Anti-D immunoglobulin Antirabies hyperimmune serum Immunoglobulin, normal human Snake antivenom Diphtheria antitoxin Tetanus antitoxin	<u>Thyroid hormones and antagonists</u>	Levothyroxine Potassium iodide Propylthiouracil
<u>Vaccines</u>	B.C.G. Diphtheria-tetanus Diphtheria-pertussis-tetanus Measles Poliovirus Rabies Smallpox Tetanus Typhoid	<u>CORRECTING SOLUTIONS</u>	Glucose Oral rehydration salts Potassium chloride injection Sodium bicarbonate Sodium chloride injection Sodium lactate injection
<u>HORMONES</u>		<u>VITAMINS AND MINERALS</u>	Ascorbic acid Calcium gluconate Ergocalciferol Hexavitamin Pyridoxine Retinol
<u>Adrenal hormones and synthetic substitutes</u>	Dexamethasone Hydrocortisone Prednisolone		
<u>Androgens</u>	Testosterone ester injection		
<u>Estrogens</u>	Ethinylestradiol		
<u>Insulins</u>	Compound insulin Zinc suspension Insulin injection		
<u>Oral contraceptives</u>	Norethisterone + Ethinylestradiol		
<u>Progestogens</u>	Norethisterone		

SOURCE: WHO - Technical Information - n° 615



TABLE -II-I-B

RAW MATERIALS AND INTERMEDIATES REQUIRED FOR THE PRODUCTION OF ESSENTIAL DRUGS			
RAW MATERIAL	DRUG OR INTERMEDIATE	RAW MATERIAL	DRUG OR INTERMEDIATE
Acetanilid	Sulpha drugs	o-Aminophenol	Di-iodohydroxyquinoline
Acetaldehyde	Sulpha drugs	m-Aminophenol	p-Aminosalicylic acid (PAS) and esters
Acetic acid	Indomethacin		Paracetamol
	Phenacetin		Diloxanide
	Chloroquin	2-Aminopyridine	Mepyramine
	Sulpha drugs	2-Aminopyrimidine	Sulphadiazine
Acetic anhydride	Chloramphenicol		Sulphadimidine
	Sulfacetamide	2-Aminothiazole	Sulphathiazole derivatives
	Paracetamol	Ammonium thiocyanate	Acetazolamide
	Acetazolamide		Thiacetazone
	Thiacetazone		Vitamin B <sub>1</sub>
	Acetylsalicylic acid	Ammonia gas	All
	Vitamin B <sub>1</sub>	Ammonium sulphate	Antibiotics
	Phenacetin	Alanine	Vitamin B <sub>6</sub>
Acetoacetic ester	Amidopyrine	Aniline	Acetanilid
	Noramidopyrine methane- sulfonate	p-Anisidine	Indomethacin
	4-Diethylamino-1- methylbutylamine	Anthranilic acid	Methaqualone
Acetonitrile	Sulpha drugs	Anisaldehyde	Mepyramine
Acetone	Vitamins A, B and C		
	Ephedrine	Beet molasses	Vitamin B <sub>12</sub>
	Amodiaquin	Benzene	Vitamins
Acetophenone	p-Nitroacetophenone		Analgesics
Acetone semicarbazone	Nitrofurazone		Sulpha drugs
Acetoin	Sulphamethoxazole	Benzaldehyde	Thiacetazone
Acetylacetone	Sulfamethoxazole		Chloramphenicol
Acetylamino-phenol (paracetamol)		Benzoic acid and salts	Noramidopyrine methansulfonate
Acetyl chloride	Amodiaquin		Diazepam
Activated carbon	Vitamin A	Bromine	Chlordiazepoxide
Acrolein	All		Chloramphenicol
Acrylonitrile	Folic acid	Benzyl chloride	Diphenhydramine
Adipic acid	Vitamin B <sub>12</sub> , sulpha drugs		Chloramphenicol
Alcohol (absolute)	Iodipamide	Benzyl cyanide	Bephenium hydroxynaphthoate
Aluminium metal	All		Benzyl cyanide
Allyl bromide	Chloramphenicol		Phenobarbitone
Aluminium chloride (anhydrous)	Secobarbital		Pethidine
			Phenobarbitone
Amino chlorobenzophenone	Chloramphenicol	2-Benzylpyridine	Phenylacetic acid
	Prenylamine	Boric acid	Phenformin
		2-Bromopentane	Pheniramine maleate
D-2-Aminobutanol	Chlordiazepoxide	Butyl acetate	Anti-dysentery drugs
4-Amino-2,6 dimethyl- pyrimidine	Diazepam	n-Butylalcohol	Barbiturates
Aminohydantoin sulphate	Ethambutol		Penicillin
		-Butyl alcohol	Penicillin
	Sulfisomidine	n-Butylamine	Tetracyclines
	Nitrofurantoin	2-Butene-1,4-diol	Vitamins B <sub>1</sub> and B <sub>2</sub>
		Diethyl butylmalonate	Hydrochlorothiazide
		Butyl oxide	Tolbutamide, methylcopa
		n-Butyl bromide	Vitamin B <sub>6</sub>
			Phenylbutazone
			Ephedrine
			Phenylbutazone, oxyphenbutazone

TABLE -II-I-B (Cont.)

RAW MATERIALS AND INTERMEDIATES REQUIRED FOR THE PRODUCTION OF ESSENTIAL DRUGS			
RAW MATERIAL	DRUG OR INTERMEDIATE	RAW MATERIAL	DRUG OR INTERMEDIATE
Calcium cyanamide	Sulfamethoxazole	Defoamers	Antibiotics
Calcium oxide	Antibiotics	7-Dihydrocholesterol	Vitamin D
Calcium carbonate	Antibiotics	Dibutyl ether	Ephedrine
Carbon disulfide	Tolbutamide	2,4-Dichlorobenzoic acid	Furosemide
m-Chloraniline	Amodiaquin	Dichloromethyl acetate	Chloramphenicol
	Chloroquin	4,7-Dichloroquinoline	Amodiaquin
	Hydrochlorothiazide	2,5-Dichloronitrobenzene	Chlorpromazine
Chloral hydrate	Diloxanide	Dicyandiamide	Sulphaguanidine
Chloracetyl chloride	Lidocaine hydrochloride		Sulphadimidine
p-Chlorobenzoic acid	Analgesics		Phenobarbitone
	Indomethacin		Phenformin
p-Chlorobenzene sulpho- namide	Chlorpropamide	Diethylamine	Diethylcarbamazine
2-Chloroethanol	Metronidazole		Lidocaine hydrochloride
1-Chloro-2-dimethyl- aminoethane	Chlorpheniramine maleate		Amodiaquin
Chlorofluoroethane	Acetylamino-phenol (paracetamol)	Diethanolamine	Nikethamide
	Diaminodiphenylsulphone	2-Diethylaminoethanol	Diethylaminoethanol
	Halothane		Pethidine
2-Chlorophenothiazine	Chlorpromazine		Procaine hydrochloride
p-Chlorophenol	Clofibrate	4-Diethylamino-1-methyl- butylamine	4-Diethylamino-1-methylbutyl- amine
2-Chloropropyl-dimethyl- amine hydrochloride	Chlorpromazine	Diethyl carbonate	Chloroquine
Chlorosulphonic acid	Sulpha drugs, diaminodiphenyl- sulphone hydrochlorothiazide	Diethyl ethoxymethylene ester	Furazolidone
	Furosemide	Diethyl malonate	Chloroquine
	Chlorpropamide		Amodiaquin
5-Chloro-2,4-disulpho- namidoaniline	Chlorothiazide		Phenylbutazone
Cholesterol	Ethisterone	Diethylmethylethylamine	Diethylethoxymethylene malonic ester
	Spiranolactone	Diethyl oxalate	Vitamin B <sub>2</sub>
Citric acid	Tetracyclines		Pethidine, ethionamide
	Citrates		Phenobarbitone
Cinnamaldehyde	Prenylamine lactate	Dimethylamine	Vitamin B <sub>2</sub>
Cobalt nitrate	Vitamins B <sub>12</sub>	3,4-Dimethylaniline	Ethionamide
Corn-steep liquor	Antibiotics	2,6-Dimethylaniline	Chloramphenicol
Copper powder	Chlorpromazine		Bephenium hydroxynaphthoate
Cotton-seed flour	Amphotericin B	Dimethylaminochloro- ethane hydrochloride	Antihistamines
	Tetracycline	Dimethyl formamide	Antihistamines
Cyanoacetic acid	Theophylline	1-Dimethylamino-2-chloro- propane hydrochloride	Sulphadimethoxazine
Cyanoacetic ester	Folic acid	Dimethyl sulphate	Mepyramine
	Sulphadimethoxazine		Antibiotics
Cyanoacetamide	Ethionamide	Dimethyl sulphoxide	Steroids
			Promethazine and salts
			Vitamin B <sub>1</sub>
			Noramidopyrine methanesulfonate
			Aminopyrine
			Diloxanide
			Vitamin A
			Diloxanide

TABLE -II-I-B (Cont.)

RAW MATERIALS AND INTERMEDIATES REQUIRED FOR THE PRODUCTION OF ESSENTIAL DRUGS			
RAW MATERIAL	DRUG OR INTERMEDIATE	RAW MATERIAL	DRUG OR INTERMEDIATE
Dinitrobenzal chloride	Vitamin D	Gelatin	Vitamin A
Diphenyl oxide	Chloroquin	Glucose (dextrose)	Gelatin capsules
Diphenylamine	Amodiaquin	L-Glutamic acid hydrochloride	Vitamin C
Diogenin	Steroids	Guanidine nitrate	Calcium gluconate
Ergosterol	Vitamin D	Guanidine carbonate	Antibiotics
Epichlorhydrin	Xanthinol nicotinate	Hexamethylene tetramine	Folic acid
Ether	Vitamins and analgesics	Hydrazine hydrate	Folic acid
2-Ethoxyethanol	Tetracyclines	Hydrozine sulphate	Sulpha drugs
Ethyl acetate	Vitamins	Hydrobromic acid	Chloromphenicol
Ethyl bromide	Phenobarbitone	Hydrogen peroxide (30%)	Isoniazid
Ethylene dichloride	Vitamin A	Hydroxyethylhydrazine	Thiacetazone
Ethylene diamine	Ethambutol	2-Hydroxymethylpyridazine	Nitrofurantoin
Ethylene diamine tetraacetic acid (EDTA)	Chloramphenicol	3-Hydroxymethylpyridazine	Acetazolamide and others
2-Ethylhexanol	Isoniazid (INH)	Hydroxylamine hydrochloride	Methyl dopa
Ethyl orthoformate	Diethylcarbamazine	3-Hydroxyquinoline	Tolbutamide
Ethyl chloroformate	Bephenium hydroxynaphthoate	Hydroquinone	Furazolidone
Ethylene oxide	Chloroquin	Hexane	Bephenium hydroxynaphthoate
Ethylene chlorohydroin	Amodiaquin	Iodine	Pyrazinamide
Ethyl palmitate	Ethylene diamine tetraacetic acid (EDTA)	Isoamyl formate	Hydroxy urea
Ethylisopropyl malonate	Caffeine and thiophylline	Isopropyl alcohol	Sulfadimethazine
Ethylmethyl ketone	Antibiotics	Isopropyl ether	Halogenated oxyquinolines
Filter aids	Antibiotics	Isophytol	Vitamin A
Formamide	Diethylethoxymethylene malonate	Ketoacetal	Soya-flour vitamins
Formaldehyde (30%)	Vitamin B <sub>6</sub>	Lard oil	Iodochloro- and dichlorohydroxyquinoline
Formic acid	Chloroamphenicol	Lithium metal	Imipramine
Fumaronitrile	4-Diethylamino-1-methylbutylamine	Lactic acid	Chloramphenicol, tetracyclines
Furfurylamine	Furazolidone	Levulinic acid	Vitamins
	Vitamin B <sub>6</sub>	Maleic acid	Vitamin E
	Diethylaminoethanol	Magnesium metal	Vitamin A
	Vitamin A	Malonic ester	Vitamin A
	Amylobarbitone	Methoxypridoxin	Riboflavin
	Ethionamide		Amylobarbitone and other barbiturates
	Vitamins		Vitamin B <sub>6</sub>
	All		
	Hydrochlorothiazide and other chlorothiazides		
	Streptomycin		
	Chloroamphenicol		
	Amodiaquin		
	Tetracycline		
	Isoniazid		
	p-Aminosalicylic acid and esters		
	Diethylcarbamazine		
	Vitamin B <sub>6</sub>		
	Hydrochlorothiazide		
	Vitamin B <sub>6</sub>		
	Furosemide		

TABLE -II-I-B (Cont.)

RAW MATERIALS AND INTERMEDIATES REQUIRED FOR THE PRODUCTION OF ESSENTIAL DRUGS			
RAW MATERIAL	DRUG OR INTERMEDIATE	RAW MATERIAL	DRUG OR INTERMEDIATE
Methyl alcohol	Streptomycin Chloramphenicol Vitamin A Vitamin C Ephedrine Pethidine Vitamin D Chloroquine Ephedrine Caffeine Thiophylline Vitamin A	p-Nitrobenzoyl chloride 5-Nitrofurfuryl diacetate	Folic acid Furazolidone Nitrofurazone Antihypertensive Methyldopa Methyldopa Methyldopa Iodochloro- and Diiodohydroxy-quinoline Thiacetazone Procain hydrochloride Imipramine Procaine hydrochloride Iodipamide Chloroquin phosphate
Methylamine (40%)	Amidopyrin Noramidopyrine methanesulfonate Metronidazole Chloramphenicol Vitamin ? Sulphamerazine p-Aminosalicylic acid and esters	p-Nitrotoluene	Vitamin B <sub>12</sub> Vitamin B <sub>7</sub> Diethyl oxalate Tetracycline
-Methylalanine	Xanthinol nicotinate Vitamin A Vitamin A	p-Nitrobenzoic acid m-Nitrobenzoic acid Novaldiamine	Antibiotics
Methylbenzene sulphonate	Chloramphenicol Tetracycline p-Aminosalicylic acid and esters	1-Octanol Oxalic acid	Vitamin A Chloramphenicol Vitamin A Insulin Vitamins Acetylamino-phenol (paracetamol) Salicylic acid Iodochloro- and Diiodohydroxy-quinoline
-Methylimidazole	Tolbutamide Chlorpropamide Vitamin A Sulphadimethoxazine	Oil (maize, peanut or soya)	Bephenium hydroxynaphthoate Chloroquin Promethiazine and salts Penicillin V Ephedrine Penicillin Thiabendazole
Methyldichloroacetate	Antibiotics Vitamins Ethionamide Vitamin K Meproamate Chloramphenicol Analgesics Vasodilators Xylocaine Piperazine salts	Palladinized charcoal Palladium chloride Palmitoyl chloride Pancreas (animal gland) Paraformaldehyde Phenol	Penicillin Ampicillin Phenformin Diethylcarbamazine Phenobarbitone Antimalarials Chloroquin Vitamin B <sub>1</sub> Nikethamide Ethionamide
Methyl acrolein			
Methylaminophenol			
-Methylaminoethanol			
Methylene chloride			
Methylethylpyridine			
Methyl formate			
Methylisobutyl ketone			
Methylaminochloroacetate			
Methylcyanoacetate			
Methylene dichloride			
Methylethyl ketone			
b-Methylnapthalene			
2-Methyl-1,3-propanediol			
Monochlorobenzene			
Monochloroacetic acid			
Monoethanolamine			
Nickel catalyst			
Nickel alloy (Raney nickel)			
p-Nitroacetophenone			
Nitrobenzene			

TABLE -II-I-B (Cont.)

RAW MATERIALS AND INTERMEDIATES REQUIRED FOR THE PRODUCTION OF ESSENTIAL DRUGS			
RAW MATERIAL	DRUG OR INTERMEDIATE	RAW MATERIAL	DRUG OR INTERMEDIATE
Phosphorus trichloride	Methaqualone hydrochloride	Salicylic acid	Acetylsalicylic acid
Phosphorus pentachloride	Ethionamide	Silicones	Sodium salicylate
Phetyl bromide	Vitamin E	Sodamide	Antibiotics
Phenyl acetone	Phenylamine	Sodium borohydride	Petidine
Phenylhydrazine	Sulpha drugs	Sodium benzoate	Vitamins
n-Picoline	Nicotinic acid	Sodium bromide	Vitamin A
	Nicotinamide	Sodium citrate	Analgesics
	Nikethamide	Sodium acetate	Antibiotics
Piperazine hexahydrate	Diethylcarbamazine	Sodium cyanide	Chloramphenicol
	Piperazine salts		Phenobarbitone
Piperidine	Ethionamide		Vitamin B <sub>12</sub>
Potassium acetate	Antibiotics		Phenylbutazone
	Ethionamide		Diloxanide
Potassium borohydride	Vitamin A	Sodium diethyldithio-	
	Chloramphenicol	carbamate	Vitamin A
Potassium hydroxide	Antibiotics	Sodium ferrocyanide	Tetracycline
	Vitamin B <sub>2</sub>	Sodium hydrosulphite	Antibiotics
	Synthetic	Sodium metal	Metamizol
Potassium carbonate	p-Aminosalicylic acid and		Folic acid
	esters		Phenobarbitone
	Penicillin		Vitamin B <sub>1</sub>
Potassium dihydrogen			4-Diethylamino-1-methyl-
phosphate	Antibiotics		amine
Potassium permanganate	Pyrazinamide	Sodium methoxide	Aminopyrine
	Nicotinic acid		Vitamin A
Potassium cyanate	Tolbutamide		Phenylbutazone
	Chlorpropamide		Sulpha drugs
Potassium cyanide	Vitamin B <sub>12</sub>		Analgesics
Potassium thiocyanate	Tolbutamide	Sodium sulphide	Analgesics
	Chlorpropamide	Sodium metabisulphite	Vitamins
Potassium ferricyanide	Antibiotics	Sorbitol	Vitamin C
Procaine hydrochloride	Penicillin	Sodium hydroxide	All
Propargyl bromide	Vitamin A	Sodium carbonate	All
n-Propylamine	Chlorpropamide	Sodium nitrate	Vitamin B <sub>12</sub>
	Probencid		Folic acid
Pyridine	Sulpha drugs		Chloramphenicol
Pyrazine monocarbocyclic			Phenacetin
acid	Pyrazinamide		Noramidopyrine methanesulfonate
		Sodium phosphate	Antibiotics
Quaternary ammonium		Soya flour	Antibiotics
compounds	Penicillin and other	Sulphuric acid	All
	antibiotics	Stearyl alcohol	Vitamin C
Quaternary ammonium	Tetracyclines	Stannic chloride	Analgesics
compounds	Hydroxyquinolines	Sulphur	Anti-TB drugs
Quinoline			
Resins	Streptomycin and other		
	antibiotics		

TABLE -II-I-B (Cont.)

RAW MATERIALS AND INTERMEDIATES REQUIRED FOR THE PRODUCTION OF ESSENTIAL DRUGS			
RAW MATERIAL	DRUG OR INTERMEDIATE	RAW MATERIAL	DRUG OR INTERMEDIATE
Tartaric acid	Chloramphenicol, sulpha drugs	Urea	Chloramphenicol
Thiosemicarbazide	Anti-TB drugs	Urethane	Vitamin B <sub>2</sub>
Toluene	Analgesics	Vanillin	Meprobamate
o-Toluidine	Methaqualone		Methyldopa
Trichloroethylene	Chloramphenicol		Anti-hypertensives
	Emetine		
	Bephenium hydroxynaphthoate	Wax emulsion	Antibiotics
	Phenylbutazone		
p-Toluenesulphonamide	Tolbutamide		
Trimethylquinol	Vitamin E	o-Xylene	Chloramphenicol
Thionyl chloride	Procaine hydrochloride		Vitamin B <sub>2</sub>
	Pethidine		Phenylbutazone
	Hydrochlorothiazide	m-Xylidine	Xylocaine
	4-Diethylamino-1-methyl- butylamine		
Thiazole-4-carboximide	Thiobendazole	Zinc dust	Phenylbutazone
Triethylamine	Tetracycline	Zinc chloride	Chloramphenicol
	Vitamin B		Vitamins
L-Tyrosine	Anti-convulsants (L-dopa)		

SOURCE: UNIDO - Monographs on Appropriate Industrial Technology - n° 10

TABLE II-I-C

CONSUMPTION OF PHARMACEUTICAL PRODUCTS IN THE WORLD (U.S. \$ Millions)			
REGION	1983	1985	1990
North - America	18.530,-	20.560,-	23.940,-
Western Europe	30.850,-	33.920,-	44.840,-
Eastern Europe	14.760,-	16.650,-	21.760,-
Latin America	5.350,-	6.640,-	11.950,-
Asia	23.380,-	27.540,-	38.460,-
Africa	2.820,-	3.710,-	7.150,-
Oceania	810,-	980,-	1.400,-
T O T A L	96.500,-	110.000,-	150.000,-

TABLE II-I-E

CONSUMPTION OF PHARMACEUTICAL PRODUCTS BY THERAPEUTIC GROUPS (U.S. \$ BILLION)						
THERAPEUTIC GROUP	1983		1985		1990	
	Value	%	Value	%	Value	%
Antibiotics	8.25	11	11.00	10	18.00	12
Cardiovascular	6.00	8	10.00	9	15.00	10
Antiarthritics	3.75	5	6.65	6	10.50	7
Analgesics	2.25	3	3.32	3	4.50	3
Cough & cold medicine	2.25	3	3.32	3	4.50	3
Diuretics	1.50	2	2.22	2	3.00	2
Steroids	1.50	2	3.32	2	4.50	3
Estrogens	1.50	2	2.22	2	4.50	3
Cancerchemotherapeutics	1.50	2	3.32	3	7.50	5
Psychotherapeutics	3.00	4	5.55	5	9.00	6
All Others	43.50	58	59.08	54	69.00	46
T O T A L	75.00	100	110.000	100	150.000	100

SOURCE: International Research Limited  
SCRIPT - N<sup>o</sup> - 653 - 654

TABLE - II - I - D

CONSUMPTION OF PHARMACEUTICAL PRODUCTS IN SELECTED DEVELOPING COUNTRIES (U.S. \$ Millions)			
COUNTRY	1980	1985	1990
Algeria	325,-	400,-	810,-
Argentina	2.100,-	2.238,-	3.835,-
Brazil	2.270,-	4.350,-	7.830,-
Chile	48,-	60,-	110,-
Colombia	780,-	995,-	1.800,-
Ecuador	150,-	195,-	350,-
Egypt	520,-	675,-	1.300,-
Chana	59,-	77,-	150,-
India	1.100,-	1.275,-	1.875,-
Indonesia	740,-	885,-	1.300,-
Iran	780,-	966,-	1.420,-
Iraq	185,-	224,-	324,-
Kenya	43,-	55,-	105,-
Korea (South)	1.250,-	1.505,-	2.210,-
Kuwait	41,-	48,-	67,-
Libya	66,-	85,-	165,-
Malaysia	75,-	90,-	130,-
Mexico	1.730,-	2.095,-	3.780,-
Morocco	225,-	290,-	555,-
Nigeria	450,-	580,-	1.115,-
Pakistan	205,-	250,-	365,-
Peru	610,-	785,-	1.410,-
Philippines	500,-	595,-	875,-
Saudi Arabia	260,-	305,-	450,-
Singapore	29,-	35,-	52,-
Sri Lanka	27,-	32,-	47,-
Syria	132,-	157,-	220,-
Thailand	265,-	310,-	460,-
Turkey	710,-	830,-	1.215,-
Venezuela	460,-	925,-	1.665,-

SOURCE: International Research Limited



TABLE - II - II

PREVAILING DISEASE PATTERN IN DEVELOPING COUNTRIES (BY REGIONS)					
THERAPEUTIC GROUP	DISEASE	MORBIDITY (Thousand of cases)			
		Africa	Asia (less India)	India	Latin America
Anthelmintics	Ancylostomiasis	88.8	n.a.	n.a.	294.9
Immunologicals - Vaccine	Chickenpox	322.9	48.5	70.0	157.5
Antibacterial	Cholera	55.6	75.6	40.9	n.a.
Antifilarial	Filariasis	30.0	1.0	n.a.	1.0
Antibacterial	Gonococcal infection	1,200.0	264.0	114.0	234.3
Antileprosy	Leprosy:      Prevalence:	287.2	249.7	1,569.0	n.a.
		Incidence :	13.6	20.1	141.3
Antimalaria	Malaria	8,172.7	2,098.2	5,166.1	383.2
Immunological - Vaccine	Measles	1,455.0	276.0	74.2	248.5
Immunological - Vaccine	Mumps	141.5	85.7	n.a.	108.7
Antibacterial	Other Venereal diseases	n.a.	151.6	n.a.	n.a.
Anthelmintic	Schistosomiasis	199.9	n.a.	n.a.	n.a.
Antibacterial	Syphilis	266.3	32.6	59.1	120.0
Immunological - Vaccine	Tetanus	15.0	11.6	83.3	n.a.
Antibacterial	Trachoma active	259.6	738.7	n.a.	n.a.
Antituberculosis	Tuberculosis	401.1	773.5	472.0	170.3
	Whooping Cough	378.2	132.5	195.7	150.3
Antiprotozoal	Amoebiasis	204.1	254.6	n.a.	166.3
Antibacterial	Bacillary dysentery	1,100.0	418.0	n.a.	33.7
Antibacterial	Diarrhoeal disease	396.0	165.0	n.a.	n.a.
Antibacterial-gastrointestinal	Enterities	n.a.	154.9	n.a.	n.a.
	Hepatitis infectious	135.1	71.2	100.9	69.0
Antibacterial	Influenza	1,403.5	2,868.5	1,691.0	1,981.4
Antibacterial	Intestinal parasitism	500.5	n.a.	n.a.	n.a.
	Streptococcal sore throat	189.8	185.0	n.a.	76.3
Antibacterial	Typhoid and paratyphoid	53.5	132.8	n.a.	46.6

SOURCE: WHO Statistics  
National Academic of Sciences

TABLE - II - III - A

TOTAL POPULATION INCREASES & AVERAGE ANNUAL GROWTH RATES FOR DEVELOPING COUNTRIES TO 2000									
	TOTAL POPULATION (MILLIONS)					AVERAGE ANNUAL RATE OF INCREASE (%)			
	1980	1985	1990	1995	2000	1980/85	1985/90	1990/95	1995/2000
<u>Latin America</u>									
Tropical S.America	204.0	234.1	267.4	303.3	341.4	2.76	2.66	2.52	2.37
Central America	92.8	109.2	128.1	149.1	172.4	3.26	3.18	3.04	2.91
Temperate S.America	41.1	43.8	46.4	48.9	51.2	1.27	1.17	1.04	0.93
Caribbean	30.6	33.5	36.5	39.8	43.1	1.79	1.76	1.71	1.61
TOTAL Latin America	368.5	420.6	478.4	541.1	608.1	2.65	2.58	2.46	2.34
	=====	=====	=====	=====	=====				
<u>Africa</u>									
Western	141.0	165.1	193.3	225.5	261.4	3.16	3.15	3.09	2.95
Eastern	133.6	155.7	181.4	210.6	242.8	3.06	3.06	2.99	2.85
Middle	53.1	60.5	58.8	77.6	86.3	2.61	2.56	2.41	2.13
Northern	108.7	125.5	144.0	163.6	183.7	2.87	2.75	2.55	2.32
Southern	33.0	37.8	43.0	48.4	54.0	2.72	2.56	2.37	2.18
TOTAL Africa	469.4	544.6	620.5	725.7	828.2	2.97	2.93	2.81	2.64
	=====	=====	=====	=====	=====				
<u>Asia (1)</u>									
East	62.6	68.9	75.3	81.6	87.4	1.91	1.78	1.59	1.39
Middle & South	955.7	1078.4	1209.4	1345.4	1481.8	2.41	2.29	2.13	1.93
South - East	367.8	414.9	464.0	512.9	559.4	2.41	2.24	2.00	1.74
South - West	98.2	112.9	129.1	146.4	164.1	2.79	2.69	2.51	2.28
TOTAL Asia	1484.3	1675.1	1877.8	2086.3	2292.7	2.62	2.58	2.20	2.00
	=====	=====	=====	=====	=====	=====	=====	=====	=====
<u>Oceania (2)</u>									
Melanesia	3.6	4.1	4.6	5.2	5.8	2.66	2.56	2.45	2.16
Polynesia & Micronesia	1.5	1.6	1.7	1.9	2.0	1.90	1.72	1.50	1.22
TOTAL Oceania	5.1	5.7	6.3	7.1	7.8	2.41	2.37	2.10	2.00
TOTAL LDC's	2327.3	2646.0	2983.0	3360.2	3736.8	2.17	2.12	1.98	1.84
	=====	=====	=====	=====	=====				

(1) Excludes Japan and China

(2) Excludes Australia and New Zealand

SOURCE: International Research Limited

TABLE - II - III - B

SOCIO-ECONOMIC PROFILE AND TRENDS IN SELECTED DEVELOPING COUNTRIES								
COUNTRY	YEAR	POPULATION			LIFE EXPENTANCY		INCOME PER CAPITA	LABOR FORCE (THOUSANDS)
		Total (Millions)	Urban %	Rural %	Males	Females		
Algeria	1980	18.62	60.8	39.2	55.2	57.4	890	4.220
	1985	22.26	66.6	33.4			983	5.054
	1990	26.60	70.5	29.5			1.090	6.114
Argentina	1980	27.05	82.4	17.6	66.1	72.9	1.554	10.379
	1985	28.63	84.1	15.9			1.748	10.945
	1990	30.10	85.5	14.5			2.173	11.507
Brazil	1980	126.3	65.0	35.0	60.7	66.7	1.267	40.036
	1985	145.0	68.7	31.3			1.549	46.330
	1990	165.0	72.0	28.0			1.773	53.620
Chile	1980	11.12	81.1	18.9	62.4	69.0	321	3.695
	1985	12.11	83.4	16.6			339	4.108
	1990	13.11	85.0	15.0			409	4.482
Colombia	1980	27.16	70.2	29.8	60.7	63.7	604	
	1985	30.91	74.1	25.9			690	
	1990	34.97	77.1	22.9			797	
Ecuador	1980	8.06	44.7	55.3	58.0	62.0	727	2.573
	1985	9.45	47.7	52.3			867	3.035
	1990	11.05	51.0	49.0			970	3.557
Egypt	1980	41.97	45.4	54.6	53.6	56.1	323	119
	1985	47.23	47.7	52.3			376	135
	1990	52.64	50.5	49.5			407	153
Ghana	1980	11.67	35.9	64.1	46.7	50.0	475	3.891
	1985	13.66	39.6	60.4			457	4.541
	1990	15.97	43.5	56.5			479	5.365
India	1980	693	22.4	77.6	52.0	51.0	140	277 MM
	1985	774	24.3	75.7			150	316 "
	1990	858	26.9	73.1			166	358 "
Indonesia	1980	152	20.4	79.6	48.7	51.3	251	54 MM
	1985	170	22.4	77.6			315	62 "
	1990	188	25.0	75.0			377	71 "

TABLE II-III-B (Cont.)

SOCIO-ECONOMIC PROFILE AND TRENDS IN SELECTED DEVELOPING COUNTRIES								
COUNTRY	YEAR	POPULATION			LIFE EXPENTANCY		INCOME PER CAPITA	LABOR FORCE (THOUSANDS)
		Total (Millions)	Urban %	Rural %	Males	Females		
Iran	1980	38.05	49.9	50.1	53.1	53.9	1.959	10.890
	1985	44.23	54.2	45.8			2.293	12.780
	1990	50.90	58.1	41.9			2.617	15.011
Iraq	1980	13.10	71.6	28.4	53.6	56.7	1.398	3.292
	1985	15.50	76.1	23.9			1.634	3.920
	1990	18.15	79.5	20.5			1.832	4.673
Kenya	1980	16.40	14.2	85.8	53.9	57.5	240	6.349
	1985	19.89	16.7	83.3			251	7.668
	1990	23.99	19.5	80.5			245	9.370
Korea (South)	1980	37.99	54.8	45.2	60.5	64.6	551	14.742
	1985	41.32	60.5	39.5			593	16.543
	1990	44.60	65.2	34.8			662	18.261
Kuwait	1980	1.37	88.3	11.7	67.3	71.6	9.791	376
	1985	1.81	91.2	8.8			8.610	492
	1990	2.29	93.0	7.0			8.933	620
Libya	1980	2.89	52.2	47.8	53.8	57.0	4.193	731
	1985	3.42	59.6	40.4			4.120	871
	1990	4.05	65.2	34.8			4.591	1.048
Malaysia	1980	13.63	29.4	70.6	59.5	63.1	932	4.806
	1985	15.41	31.5	68.5			1.132	5.601
	1990	17.07	34.2	65.8			1.342	6.457
Mexico	1980	70.2	66.7	33.3	63.6	67.4	1.029	20.504
	1985	82.4	70.0	30.0			1.135	24.560
	1990	98.4	72.9	27.1			1.275	29.298
Morocco	1980	20.29	40.5	59.5	53.8	57.0	523	5.492
	1985	23.84	43.9	56.1			566	6.527
	1990	27.76	47.5	52.5			586	7.770
Nigeria	1980	77.0	20.4	79.6	45.9	49.2	422	29.9 MM
	1985	91.1	22.9	77.1			481	35.1 "
	1990	108.0	26.1	73.9			538	41.6 "

TABLE II-III-B (Cont.)

SOCIO-ECONOMIC PROFILE AND TRENDS IN SELECTED DEVELOPING COUNTRIES								
COUNTRY	YEAR	POPULATION			LIFE EXPENTANCY		INCOME PER CAPITA	LABOR FORCE (THOUSANDS)
		Total (Millions)	Urban %	Rural %	Males	Females		
Pakistan	1980	82.4	28.2	71.8	51.9	51.7	162	22.9 MM
	1985	96.7	30.6	69.4			168	26.9 "
	1990	112.8	69.4	66.5			177	31.9 "
Peru	1980	17.78	67.4	32.6	55.1	58.0	718	5.286
	1985	20.33	71.3	28.7			762	6.148
	1990	23.10	74.5	25.0			876	7.060
Philippines	1980	50.95	36.2	63.8	59.1	62.4	383	18.242
	1985	58.85	38.7	61.3			453	21.708
	1990	67.23	41.6	58.4			551	25.549
Saudi Arabia	1980	8.37	66.8	33.2	46.7	49.0	6.251	2.192
	1985	9.78	73.0	27.0			8.002	2.540
	1990	11.47	27.0	22.7			8.962	2.985
Singapore	1980	2.43	74.1	25.9	67.7	71.9	3.203	975
	1985	2.61	74.5	25.5			4.282	1.066
	1990	2.79	74.9	25.1			5.561	1.146
Sri Lanka	1980	14.87	26.6	73.4	62.0	65.0	190	5.370
	1985	16.18	29.5	70.5			209	6.187
	1990	17.52	32.9	67.1			240	6.862
Syria	1980	8.62	50.3	49.7	55.7	59.3	916	2.323
	1985	10.19	53.8	46.2			1.134	2.869
	1990	12.02	57.3	42.7			1.275	3.451
Thailand	1980	47.6	14.5	85.5	57.6	63.0	410	22.331
	1985	54.7	15.5	84.5			471	26.470
	1990	62.2	17.5	82.5			509	30.869
Turkey	1980	45.4	47.4	52.6	60.3	61.6	1.088	19.782
	1985	51.2	51.8	48.2			1.254	22.552
	1990	57.2	55.8	44.2			1.371	25.633
Venezuela	1980	14.65	83.3	16.7	64.6	68.3	21.164	4.457
	1985	16.90	85.7	14.3			2.493	5.222
	1990	19.31	87.5	12.5			2.893	6.042

SOURCE: International Research Limited  
IMS  
World CEAD - Future Group - 1981

TABLE II-IV

ESSENTIAL DRUGS REQUIRED IN DEVELOPING COUNTRIES IN RELATION WITH PREVAILING DISEASES			
THERAPEUTIC GROUP	DRUG	THERAPEUTIC GROUP	DRUG
<u>Antitrypanosomals</u>	Pentamidine Suramin	<u>Antimalarials</u>	Chloroquine Primaquine Prymethamine Quinine Amodiaquine
<u>Anthelmintics</u>	Mebendazole Piperazine Niridazole Bephenium Metriphosphate Thiabendazole	<u>Antifilarial</u>	Diethyl-carbamazine Suramin
<u>Antidysenteric</u>	Di-iodo Hydroxi-quinoline Metronidazole Furazolidone	<u>Antileprotic</u>	Dapsone
<u>Antibacterial</u>	Benzyl-Penicillin Ampicillin Chloramphenicol Tetracycline Erythromycin Gentamycin Sulfadiazine Galzosulfapyridine Sulfamoxazole Trimethoprim	<u>Antituberculosis</u>	P. Amino Salicylic Acid Isoniazid Ethambutol
		<u>IMMUNOLOGICALS</u>	
		<u>Sera and immunoglobulins</u>	Anti-D immunoglobulin Antirabies hyperimmune serum Diphtheria antitoxin Immunoglobulin, normal human Snake antivenom Tetanus antitoxin
		<u>Vaccines</u>	BCG vaccine Diphtheria-tetanus vaccine Diphtheria-pertussis-tetanus vaccine Measles vaccine Poliovirus vaccine Rabies vaccine Smallpox vaccine Tetanus vaccine Typhoid vaccine

Source : National Academy of Sciences - Pharmaceuticals for Developing Countries  
M. Alfonso Sanjuan - Medicamentos Esenciales - Aguilar Ed. 1981

TABLE II - V

PHARMACEUTICAL INDUSTRY PROFILE IN SELECTED DEVELOPING COUNTRIES				
COUNTRY	YEAR	CONSUMPTION PER CAPITA (US\$)	SHARE OF TOTAL WORLD CONSUMPTION (%)	SELF-SUFFICIENCY BY YEAR 2000 (%)
Algeria	1980	13.75	0.301	15
	1985	17.97	0.363	
	1990	30.45	0.540	
Argentina	1980	73.36	2.520	50
	1985	78.17	2.034	
	1990	127.41	2.556	
Brazil	1980	23.16	3.027	55
	1985	30.02	3.954	
	1990	47.31	5.220	
Chile	1980	3.65	0.100	15
	1985	4.95	0.100	
	1990	8.39	0.100	
Colombia	1980	25.87	0.747	25
	1985	32.14	0.904	
	1990	51.47	1.200	
Ecuador	1980	15.72	0.128	10
	1985	20.63	0.177	
	1990	31.67	0.233	
Egypt	1980	10.34	0.420	30
	1985	14.29	0.613	
	1990	24.70	0.867	
Ghana	1980	4.18	< 0.100	15
	1985	5.64	< 0.100	
	1990	9.39	0.100	

TABLE II - V (Cont.)

PHARMACEUTICAL INDUSTRY PROFILE IN SELECTED DEVELOPING COUNTRIES				
COUNTRY	YEAR	CONSUMPTION PER CAPITA (US\$)	SHARE OF TOTAL WORLD CONSUMPTION (%)	SELF-SUFFICIENCY BY YEAR 2000 (%)
India	1980	1.33	1.067	45
	1985	1.65	1.159	
	1990	2.19	1.250	
Indonesia	1980	4.29	0.733	25
	1985	5.22	0.805	
	1990	6.93	0.867	
Iran	1980	18.56	0.800	20
	1985	21.84	0.878	
	1990	28.90	0.947	
Iraq	1980	12.63	0.247	25
	1985	14.45	0.204	
	1990	17.85	0.216	
Kenya	1980	2.10	< 0.100	10
	1985	2.77	< 0.100	
	1990	4.38	< 0.100	
Korea	1980	30.03	1.280	50
	1985	36.42	1.368	
	1990	49.55	1.473	
Kuwait	1980	25.49	< 0.100	20
	1985	26.52	< 0.100	
	1990	29.26	< 0.100	
Libya	1980	19.42	< 0.100	10
	1985	24.85	< 0.100	
	1990	40.94	0.100	



TABLE II - V (Cont.)

PHARMACEUTICAL INDUSTRY PROFILE IN SELECTED DEVELOPING COUNTRIES				
COUNTRY	YEAR	CONSUMPTION PER CAPITA (US\$)	SHARE OF TOTAL WORLD CONSUMPTION (%)	SELF-SUFFICIENCY BY YEAR 2000 (%)
Malaysia	1980	4.82	< 0.100	5
	1985	5.84	< 0.100	
	1990	7.62	< 0.100	
Mexico	1980	21.01	1.653	55
	1985	25.12	1.905	
	1990	38.40	2.520	
Morocco	1980	9.01	0.180	15
	1985	12.16	0.264	
	1990	19.99	0.370	
Nigeria	1980	4.79	0.360	15
	1985	6.37	0.527	
	1990	10.32	0.743	
Pakistan	1980	2.22	0.207	20
	1985	2.59	0.227	
	1990	3.24	0.243	
Peru	1980	29.32	0.520	20
	1985	38.61	0.714	
	1990	61.04	0.940	
Philippines	1980	8.52	0.493	20
	1985	10.11	0.541	
	1990	13.02	0.583	
Saudi Arabia	1980	26.93	0.253	20
	1985	31.19	0.277	
	1990	39.23	0.300	

TABLE - I - V (Cont.)

PHARMACEUTICAL INDUSTRY PROFILE IN SELECTED DEVELOPING COUNTRIES				
COUNTRY	YEAR	CONSUMPTION PER CAPITA (US\$)	SHARE OF TOTAL WORLD CONSUMPTION (%)	SELF-SUFFICIENCY BY YEAR 2000 (%)
Singapore	1980	11.20	< 0.100	20
	1985	13.41	< 0.100	
	1990	18.57	< 0.100	
Sri Lanka	1980	1.69	0.100	25
	1985	1.98	0.100	
	1990	2.68	0.100	
Syria	1980	12.99	0.131	15
	1985	15.41	0.143	
	1990	18.30	0.147	
Thailand	1980	5.06	0.260	15
	1985	5.66	0.282	
	1990	7.39	0.307	
Turkey	1980	13.66	0.707	30
	1985	16.21	0.755	
	1990	21.24	0.810	
Venezuela	1980	41.24	0.613	30
	1985	54.73	0.841	
	1990	86.22	1.110	

SOURCE: International Research Limited  
World CEAD - Future Group - 1981

TABLE II-VI

SELECTED DRUGS REQUIRED WHICH HAVE A POTENTIAL TO BE PRODUCED IN DEVELOPING COUNTRIES	
THERAPEUTIC GROUP	DRUG
Analgesic	Acetylsalicylic acid Paracetamol
Anthelmintic	Bephenium Piperazine
Antibacterial	Sulphadimidine
Antifilarial	Diethylcarbamazine
Antileprotic	Dapsone
Antimalarial	Chloroquine Primaquine
Antituberculosis	Ethambutol Isoniazid
Cardiovascular	Methyldopa Reserpine
Diuretics	Furosemide
Antidiabetics	Tolbutamide
Oral contraceptives	Ethinylestradiol

SOURCE: UNIDO - 10/WG - 317/1

TABLE - II - VII

RAW MATERIALS AND INTERMEDIATES REQUIRED TO PRODUCE SELECTED ESSENTIAL DRUGS AND WHICH SHOULD BE GIVEN TOP PRIORITY			
DRUG	RAW MATERIAL OR INTERMEDIATE	DRUG	RAW MATERIAL OR INTERMEDIATE
Acetylsalicylic Acid (Ex Salicylic Acid)	Acetic Anhydride Salicylic Acid Caustic Soda	Sulphadiazine (Ex Dicyandiamide)	Acetanilide Chlorosulphonic Acid Dicyandiamide Acetyl Acetone
Acetylsalicylic Acid (Ex Phenol)	Phenol Acetic Anhydride Caustic Soda	Diethyl-carbamazine Citrate	N-Methyl Piperazine Diethylamine Citric Acid Phosgene
Sulphadiazine (Ex Guanidine Nitrate)	Acetanilide Methyl Isobutyl ketone Guanidine Nitrate Acetyl Acetone Acetic Acid Caustic Soda Chlorosulphonic acid	Diethyl-carbamazine Citrate (Ex Piperazine Hexahydrate)	Piperazine Hexahydrate Acetone Benzoyl Chloride Diethyl Carbonyl Chloride Citric Acid Formalin Formic Acid Hydrochloric Acid Toluene Caustic Soda
Dapsone (Ex p-Nitrochloro-benzene)	p-Nitrochloro-benzene Carbon Disulphide Potassium Hydroxide Ethyl Alcohol Acetic Acid Raney Nickel Chlorine Hydrogen	Chloroquine Phosphate	m-Chloro aniline Novaldiamine Ethoxymethylene Malonic Ester Triethyl Orthoformate Monochloro Acetic Acid Sodium Cyanide Ethyl Alcohol Phosphoric Acid Methanol Toluene Kerosene
Dapsone (Ex Chlorobenzene)	Chlorobenzene Chlorosulphonic Acid Aluminium Chloride Hydrochloric Acid Ammonium Hydroxide Copper Sulphate Activated Carbon	Ethambutol	D-2-Aminobutanol Isopropanol Ethylene Dichloride Sulphuric Acid Caustic Soda Flakes Hydrochloric Acid Gas
Isoniazide (Ex Gamma-Picoline)	Gamma - Picoline Potassium Permanganate Hydrazine Hydrate Methyl Alcohol Ammonia		
Isoniazide (Ex 4-Cyanopyridine)	4-Cyanopyridine Resin IRA-402 Ethanol Hydrazine Hydrate		

SOURCE: UNIDO - PC - 14

TABLE II - VIII - A

AVAILABLE TECHNOLOGIES AND PATENT SITUATION TO PRODUCE SELECTED ESSENTIAL DRUGS AND WHICH SHOULD BE GIVEN TOP PRIORITY		
D R U G	TECHNOLOGY AVAILABLE FROM	PATENT SITUATION
Acetylsalicylic Acid	Egypt, Poland, Romania	Ger. Pat. 236196 - Expired
Sulphadiazine	Egypt, China, India, Poland, U.S.S.R.	Br. Pat. 546158 552887 Us. Pat. 2407966 3119818
Diethylcarbamazine	India, France, Sweden, U.S.S.R.	Us. Pat. 2467893 2467895
Dapsone	U.S.S.R.	
Chloroquine		Ger. Pat. 683692 - Expired Us. Pat. 2233970 - Expired
Ethambutol	India	Us. Pat. 3297707
Isoniazid	India, Switzerland, USA, USSR, Romania, China	Us. Pat. 2830994 - Expired

SOURCE: UNIDO - PC.52 - PC.14 - ID/WG - 331/4

TABLE II - VIII - B

<u>ILLUSTRATIVE USAGE OF SPECIFIC PROCESSES</u>										
<u>BY THERAPEUTIC GROUPS</u>										
THERAPEUTIC GROUP	Alkylation	Carboxylation	Condensation & cyclization	Dehydration	Esterification	Halogenation	Oxidation	Sulphonation	Complex Conversions	Biotechnology
Analgesics		x			x				x	x
Anaesthetics	x		x	x	x	x			x	
Antibacterials			x				x			
Antibiotics			x						x	x
Antihistamines	x									
Cardiovascular					x					x
Central nervous stimulants	x									x
Dermatologicals		x					x			x
Diuretics									x	
Gastronomicals			x							x
Hormones									x	x
Respiratory agents	x									x
Sedatives and hypnotics	x		x		x					
Sulphonamides			x					x	x	x
Tranquilizers			x						x	x
Vitamins			x				x		x	x

Source : International Research Limited

## B. Medicinal Plant Derived Drugs (Note 1)

Table II-IX-A shows the existence and size of the existing market of medicinal plants and active substances, organized by therapeutic groups, and it proves that this market exists and that the main producers of medicinal plant are the developing countries that also produce some extracts, and therefore confirms the existence of several extraction facilities. Where no data is available, blank spaces has been left in the corresponding column. Table II-IX.B has been provided as supplementary information to show the value of this market. All tables mentioned herein have been presented at the end of this paragraph.

Comparing Table II-IX-A together with the synthetic drugs classification by therapeutic groups (Table II-I) and disease patterns in developing countries (Table II-II), an assesment can be made of how these products could supplement and/or complement the therapy with synthetic drugs by analyzing the therapeutic properties of the main plants and their extracts and highlighting which synthetic drugs could be substituted and/or complemented by these extracts. A brief summary of this analysis for some of the more important medicinal plant drugs follows, in compliance with point 3.3- b of the Terms of Reference.

### 1. Atropa Belladona

The whole plant contains various alkaloids, the principal being Atropine, 1-Hyoscyamine, Hyoscine (Scopolamine) and other alkaloids. The drying of the plant allows a partial conversion of the 1-Hyoscyamine to Atropine by enzymatic action.

#### Therapeutic applications

It is an anticholinergic alkaloid with both central and peripheral actions. It first stimulates and then depreases the central nervous system and has antispasmodic effects on smooth muscle, suppressing their uncontrolled activities. It is used for premedication before anaesthesia, for the treatment of Paralysis Agitans, in postencephalitic Parkinson's Disease and an antidote for selected poisons. It is also used for the treatment of gastric ulcers and for its antispasmodic effects in asthma and whooping cough. As Atropine sulphate it is used in eye drops and eye ointments.

If this plant is extracted, processed and product formulated locally in developing countries, it will eliminate the import of Atropine and other related active constituents from developed countries.

### 2. Catharanthus Roseus

It has three major alkaloids: Vinblastine, Vincristine and Ajmalicine.

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Note 1- Specifically fulfils point 3.3 of the Terms of Reference.

### Therapeutic applications

Vinblastine Sulphate is used particularly to treat Hodgkin's Disease, but is also used against Lymphosarcoma, Choriocarcinome, Neuroblastoma, Carcinoma of the breast, lungs and other organs and in acute and chronic Leukaemia. Both Binblastine and Vincristine are extremely valuable therapeutic agents for various forms of cancer, used singly or in combination therapy.

The extraction methods are patented in developed countries, but the processing technology could be made available to developing countries. Processing this extract locally would fill the developing countries needs for the treatment of various forms of cancer and could be also exported to developed countries.

### 3. Cephaelis Ipecacuanha

The root contains the alkaloids Emetine, Cephaeline, Psychotrine, Psychotrine Methyl Ether and Emetamine.

### Therapeutic applications

Emetine Hydrochloride is used in the treatment of Amoebiasis. Emetine-Bismuth Iodide is effective against Trophozoites in the lumen of the bowel. Ipecacuanha syrup, in small doses, is widely used as an expectorant (cough and whooping cough).

If this plant is extracted locally by developing countries, their cough preparation needs could be fulfilled. It could also be used for the treatment of Amoebiasis and will replace the importation of synthetic drugs such as Metronidazole, Chloroquine, and Iodoquinol.

### 4. Cinchona - Rubiaceae

It mainly contains Quinine, Quinidine, Cinchonine and Cinchonidine.

### Therapeutic application

Quinine is the most important alkaloid and is used chiefly as its salts, sulphate, bisulphate, hydrochloride, and dichloride for the prevention and treatment of Malaria. Quinine Hydrochloride has also been used in combination with other compounds for the treatment of Internal Hemorrhoids. Quinidine Sulphate is used for treating Cardiac Arrhythmias and to increase the pulse rate.

If processed locally by developing countries, it could replace synthetic drugs such as: Amodiaquine; Chloroquine; Proguanil and Pyrimethamine.

Quinidine Sulphate is used for the treatment of Cardiac Arrhythmias. It could replace imported drugs such as: Lidocaine, Procainamide Hydrochloride, resulting in substantial savings of foreign exchange.



5. Datura Solanaceae

It has Hyoscyamine and small quantities of Hyoscine and Atropine.

Therapeutic applications

Hyoscine Butylbromide is used for the treatment of gastric disorders, as a sedative in the treatment of acute mania and in pre-operative medication. It could replace the synthetic Hyoscine, which is being imported presently from developed countries.

6. Rauwolfia - Apocynaceae

It has Reserpine and Rescinnamine, Ajmaline, Ajmalicine and Serpentine.

Therapeutic application

They have central depressant and sedative actions, and lower the blood pressure. Reserpine has been synthesized, but for medical purposes it is still obtained from plant sources.

If manufactured in developing countries, apart from eliminating the import of reserpine, it could partially replace synthetic drugs such as Chlorpromazine, Methyldopa and Diazepines.

7. Carica Papaya (Papain), Caricaceae

The active constituent is Papain and small quantities of Chymopapain are also present.

Therapeutic applications

It is used in the treatment of infected wounds and after surgery to reduce blood clots. It is also used in preparations to control Cedema and inflammation associated with surgical or accidental trauma, infections or allergies.

By processing locally, developing countries would not have to import the Papain from developed countries.

8. Digitalis - Scrophyriaceae

Digitalis Lanata has Lanatosides, which on partial hydrolysis yields Digitoxin, Gitoxin and Digoxin. Digitalis-Purpurea yields Digitoxin, and Gitoxin on partial hydrolysis.

Therapeutic applications

Digitalis is a cardiotonic or indirect heart stimulant, and its main use is in the treatment of congestive heart failure.

No synthetic drugs have been developed so far to replace natural Digitalis Glycosides. Process technology is available for transfer from developed countries.

When produced in developing countries, it could suffice for local needs and could even be exported to developed countries.

9. Dioscorea - Dioscoraeceae

Diosgenin is the most valuable precursor for the production of steroid drugs.

Therapeutic applications

Steroid drugs have a wide variety of applications and are used as anti-inflammatory agents, anti-cancer agents, in the treatment of hormone depressant disorders and in birth control drugs.

The production of steroids is controlled by a limited number of highly skilled companies, whose production processes are protected by patents, but on a joint cooperation basis, this steroid drug production industry could be developed in developing countries. This could be a priority activity for the medicinal plant drugs section of the ITPT Centre.

10. Glycyrrhiz Glabra (Liquorice)

The active constituent is Glycyrrhizin, which consists of the potassium and calcium salts of Glycyrrhizinic acid.

Therapeutic applications

It is used as an expectorant, for the treatment of peptic ulcers, gastric ulcers and as an anti-inflammatory agent and also as a sweetening agent for diabetic and low calorie diets. It is extensively used as an expectorant in cough remedies.

When processed locally in developing countries, it could suffice the needs for cough preparations, peptic ulcer and gastric ulcer treatments, reducing substantially the import of the extracts and salts from developed countries.

11. Cassia Senna - Leguminosae

The fruits and leaves contain a number of Anthracene derivatives, of which Sennosides A and B are the principle active constituents.

Therapeutic applications

Senna preparations are mainly used as milder laxatives. By processing it locally, the importation of laxative products from developed countries could be reduced.

In view of the foregoing, it can be concluded that several essential synthetic drugs could be substituted, or at least complemented, by medicinal plant extracted drugs. Bearing in mind the information summarized in Table II-IX, the importance and extension of the use of medicinal plant extracted drugs in substitution of synthetic drugs can be seen, and therefore, it can be concluded that there is a market for the ITPT Centre for applied research and development of technologies to produce these active substances. The results should permit the profitable production of these drugs in the developing world. The ITPT Centre could play a very important role by providing technical guidance, know-how, and laboratory pilot plant tests to adapt or develop extraction technologies and arranging the transfer of technology among developing countries and from developed countries.

From the previous Tables and analysis, those medicinal plants derived drugs suitable and recommended to be produced in developing countries have been selected and presented in Table II-X.

To produce these drugs an analysis has been made of the technologies available and their patent status, summarized in Table II-XI. Together with the data obtained from the pharmaceutical profile (Table II-V) the programme for the ITPT Centre activities and the ITPT market forecast in this section can be outlined. They have been summarized respectively in Article I-4, in this chapter and also in Article II-2 of Volume III.

Tables are following:

TABLE II - IX - A  
DEVELOPING COUNTRIES AND THEIR ACTIVE SUBSTANCES BY THERAPEUTIC GROUP  
QUALITATIVE MARKET STATUS AND TREND

Therapeutic Group	Name of plant	Part of the plant used	Product	Availability			Region			Market potential		Trend
				Cultivated	Wild	African	Latin America	Asia	Method of Production	Local	Export	
Analgesics and Antipapetics	<i>Acacia arabica</i>	Stem	Gum	.	.	.	.	.	.	.	.	Steady
	<i>Acacia senegal</i>	Root	Total extract	.	.	.	.	.	.	.	.	Down
	<i>Acacia sp.</i>	Rhizome	Essential oil and crude drug	.	.	.	.	.	.	.	.	Steady
	<i>Acorus calamus</i>	Seeds	Resin and total Extract	.	.	.	.	.	.	.	.	Up
	<i>Hyperosyris</i>	Juice	Hyperosyris	.	.	.	.	.	.	.	.	Steady
	<i>Agave sibirica</i>	Leaf juice	Agave sibirica	.	.	.	.	.	.	.	.	Steady
	<i>Alus sp.</i>	Seeds	Albin	.	.	.	.	.	.	.	.	Up
	<i>Azmi bayu</i>	Fruits	Kanthoxanthin	.	.	.	.	.	.	.	.	Steady
	<i>Azmi Vinnaga</i>	Fruits	Vinagin, shellin	.	.	.	.	.	.	.	.	Up
	<i>Azmi subulatum</i>	Fruits	Essential oil	.	.	.	.	.	.	.	.	Up
Anthelematic	<i>Antirrhinum</i>	Fruits	Essential oil	.	.	.	.	.	.	.	.	Up
	<i>Andira acroba</i>	Stem wood	Total extract	.	.	.	.	.	.	.	.	Steady
	<i>Arctium sp.</i>	Fruit	Essential oil	.	.	.	.	.	.	.	.	Steady
	<i>Artemisia</i>	Flowering tops	Essential oil	.	.	.	.	.	.	.	.	Steady
	<i>Asitum</i>	Leaf and roots	Total Alkaloids	.	.	.	.	.	.	.	.	Steady
	<i>Berberis aristata</i>	Root, stem bark	Berberine	.	.	.	.	.	.	.	.	Steady
	<i>Berberis asiatica</i>	Root, stem bark	Berberine	.	.	.	.	.	.	.	.	Steady
	<i>Berberis arbuscula</i>	Root, stem bark	Berberine	.	.	.	.	.	.	.	.	Steady
	<i>Berberis lycium</i>	Stem, bark	crude drug	.	.	.	.	.	.	.	.	Steady
	<i>Berberis lycopodium</i>	Fruit	Capaicin cinnosin	.	.	.	.	.	.	.	.	Up
Diuretic	<i>Carica papaya</i>	Fruit	Papain	.	.	.	.	.	.	.	.	Steady
	<i>Carum carvi</i>	Leaves and pods	Essential oil	.	.	.	.	.	.	.	.	Up
	<i>Cassia acutifolia</i>	Leaves and pods	Sennosides	.	.	.	.	.	.	.	.	Up
	<i>Cassia sennatifolia</i>	Leaves and pods	Sennosides	.	.	.	.	.	.	.	.	Up
	<i>Cassia sennatifolia</i>	Leaves and pods	Sennosides	.	.	.	.	.	.	.	.	Up
	<i>Cassia italica</i>	Leaves and pods	Sennosides	.	.	.	.	.	.	.	.	Up
	<i>Cassia italica</i>	Leaves and pods	Sennosides	.	.	.	.	.	.	.	.	Up
	<i>Cassia italica</i>	Leaves and pods	Sennosides	.	.	.	.	.	.	.	.	Up
	<i>Cassia italica</i>	Leaves and pods	Sennosides	.	.	.	.	.	.	.	.	Up
	<i>Cassia italica</i>	Leaves and pods	Sennosides	.	.	.	.	.	.	.	.	Up

. A = steam distillation; B = water extraction; C = Alcohol extraction;  
D = extraction with other solvents

TABLE II - IX - A (Cont.)

Therapeutic Group	Name of plant	Part of the plant used	Product	Availability			Region			Market potential		Trend
				Cultivated	Wild	African	Latin America	Asia	Production	Local	Export	
Antineoplastic	<u>Catharanthus</u> <u>roseus</u>	Leaves and roots	Vinblastine, vincristine, robusine	•	•	•	•	•	•	•	•	Steady
Diagnostic Agents	<u>Coniopsis</u> <u>asiatica</u>	Whole plant	Asiatoside	•	•	•	•	•	•	•	•	Steady
Anti-infective Drug	<u>Centella</u> <u>asiatica</u>	Roots	Bacine	•	•	•	•	•	•	•	•	Up
Anti-infective Drug	<u>Cynophella</u> <u>luxurians</u>	Roots	Bacine	•	•	•	•	•	•	•	•	Up
	<u>Ceratomia</u> <u>siligua</u>	Fruit	Total extract	•	•	•	•	•	•	•	•	Steady
Essential Oil	<u>Chenopodium</u> <u>ambrosioides</u>	Flowering top and whole plant	Essential oil	•	•	•	•	•	•	•	•	Steady
Anti-arrhythmic	<u>Cinchona</u> sp.	Stem and root bark	Quinine, quinidine	•	•	•	•	•	•	•	•	Up
Anti-migrane	<u>Clevisia</u> <u>purpurea</u>	Seeds	Expamine, ergotamine, ergometrine	•	•	•	•	•	•	•	•	Steady
	<u>Cola nitida</u>	Seeds	Total extract	•	•	•	•	•	•	•	•	Up
	<u>Cambretin</u> <u>micranthum</u>	Leaves	Total extract	•	•	•	•	•	•	•	•	Up
	<u>Camphora</u> <u>malab</u>	Resin	Gum	•	•	•	•	•	•	•	•	Up
Hormones	<u>Costus speciosus</u> <u>Costus citratus</u>	Rhizomes	Diosgenin	•	•	•	•	•	•	•	•	Steady
	<u>Cymbopogon</u> <u>flexuosus</u>	Leaves	Essential oil	•	•	•	•	•	•	•	•	Steady
	<u>Datura</u> sp.	Leaves	Atropine	•	•	•	•	•	•	•	•	Up
Ophthalmological preps.	<u>Derris elliptica</u>	Root	Rotenone	•	•	•	•	•	•	•	•	Up
	<u>Digitalis</u> <u>lanata</u>	Leaves	Digoxin and lanatosides	•	•	•	•	•	•	•	•	Steady
Cardiotonic	<u>Dioscorea</u> sp. 1 <u>Dioscorea</u> <u>richardii</u>	Tubers	Diosgenin	•	•	•	•	•	•	•	•	Steady
Hormones	<u>Dubautia</u> <u>pyroloides</u>	Stem	Hyoscyamine, hyocine	•	•	•	•	•	•	•	•	Steady
Respiratory Track Drugs	<u>Ephedra</u> <u>gerardiana</u>	Whole plant	1-Ephedrine	•	•	•	•	•	•	•	•	Steady
Respiratory Track Drugs	<u>Ephedra</u> <u>vulgaris</u>	Whole plant	1-Dihydrine	•	•	•	•	•	•	•	•	Steady
Respiratory Track Drugs	<u>Ephedra</u> <u>interdensa</u>	Whole plant	1-Ephedrine	•	•	•	•	•	•	•	•	Steady

• A = Steam distillation; B = Water extraction; C = Alcohol extraction; D = Extraction with other solvents

TABLE II - IX - A (Cont.)

Therapeutic Group	Name of plant	Part of the plant used	Product	Availability			Region			Market potential		Trend		
				Cultivated	Wild	African	Latin America	Asia	Method of Production	Local	Export			
Antiquit, antiinflammatory Antiquit, antiinflammatory	<u>Eucalyptus</u> <u>globulus</u>	Leaves	Essential oil	•		•				A	•	•	Steady	
	<u>Claytonia</u> <u>flavescens</u>	Leaves	Claytonine		•					C	•	•	Steady	
	<u>Glaucium</u> <u>simplex</u>	Rhizome	Colchicine		•					D	•	•	Steady	
	<u>Gliricidia</u> <u>sepium</u>	Rhizome	Colchicine		•					D	•	•	Steady	
	<u>Glycyrrhiza</u> <u>glabra</u>	Rhizome	Total extract		•					B	•	•	Steady	
	<u>Mercurialis</u> <u>annua</u>	Roots	Kantharidin		•					D	•	•	Steady	
	<u>Hibiscus</u> <u>sabdariffa</u>	Flower	Dried flowers		•							•	•	Up
	<u>Melastroma</u> <u>floribunda</u>	Stem bark	Concrete and total alkaloid		•					D	•	•		
	<u>Hydrocotyle</u> <u>kurzii</u>	Seeds	Fried oil, hydrocarpic acid		•							•	•	
	<u>Myocarpus</u> <u>wightiana</u>	Seeds	Chauliopicric acid									•	•	
Gastrointestinal	<u>Myosoton</u> <u>sp.</u>	Root	Myosotonine and other alkaloids		•						•	•		
	<u>Lippia</u> <u>chayantieri</u>	Whole plant	Camphor and essential oil		•					A	•	•	Steady	
	<u>Lobelia</u> <u>sp.</u>	Leaf, flower, ling top	Lobeline and total extract		•					D	•	•		
	<u>Mentha</u> <u>sp.</u>	Whole plant	Essential oil		•					A	•	•	Up	
	<u>Mentha</u> <u>piperita</u>	Seeds	l-Dopa		•					B	•	•	Steady	
	<u>Mucuna</u> <u>pruriens</u>	Seeds	Fried oil		•							•		
	<u>Opuntia</u> <u>echinata</u>	Capulae and latex	Morphine, codeine		•					D	•	•	Up	
	<u>Papaver</u> <u>sumiferum</u>	Whole plant	Mescaline, papaverine		•					C	•	•	Steady	
	<u>Passiflora</u> <u>sp.</u>	Stem bark	Yohimbine and total extract		•					D	•	•	Steady	
	<u>Psychotria</u> <u>peruviana</u>	Seeds	Psychotrine, atiguanterol		•					D	•	•	Steady	
Ophthalmological preparation	<u>Physalis</u> <u>peruviana</u>	Seeds	Physotigmine, atiguanterol		•					C,D	•	•		
	<u>Physalis</u> <u>peruviana</u>	Leaves	Pilocarpine		•					D	•	•	Steady	
	<u>Plantago</u> <u>ovata</u>	Seeds husks	Isopagulin		•						•	•	Up	
Ipthalmological prep. Antidiarrhoeal Antidiarrhoeal	<u>Plantago</u> <u>ovata</u>	Seeds husks	Isopagulin		•						•	•	Steady	
	<u>Plantago</u> <u>ovata</u>	Seeds husks	Isopagulin		•						•	•	Up	

A = Steam distillation; B = Water extraction; C = Alcohol extraction; D = Extraction with other solvents

TABLE II - IX - A (Cont.)

Therapeutic Group	Name of plant	Part of the plant used	Product	Availability		Region		Method of Production		Market Potential		Trend
				Cultivated	Wild	African	Latin America	Asia	Local	Export		
Cardiovasc. anti-hypertens.	<i>Pachyphyllus henryi</i> (P. yvardi)	Tubers	Pachyphyllin, protophyllotoxin	.	.	.	.	.	D	.	.	Up
	<i>Polygala senegal</i>	Roots	Resin	.	.	.	.	.	C	.	.	Steady
	<i>Prunus africana</i>	Stem bark	Total extract	.	.	.	.	.	D	.	.	Steady
	<i>Psoralea corylifolia</i>	Seeds	Psoralen	.	.	.	.	.	D	.	.	Steady
	<i>Rauwolfia</i>		reserpiline	.	.	.	.	.	D	.	.	Up
	<i>Rhynchospora</i>	Roots	Reserpine, ajmaline, deserpidine, reserpinamine	.	.	.	.	.	D	.	.	Up
	<i>Solanum</i>											
	<i>Solanum sp.</i>											
	<i>Sterculia apetala</i>	Bark	Crude extract	.	.	.	.	.	C	.	.	Steady
	<i>Strophanthus</i>	Rhizome	Total extract	.	.	.	.	.	C	.	.	Steady
Hormones	<i>Rhus palmatus</i>	Rhizome	Total extract	.	.	.	.	.	C	.	.	Steady
	<i>Ricinus communis</i>	Seeds	Fixed oil	.	.	.	.	.	D	.	.	Steady
	<i>Solanum</i>	Berries	Solanadine	.	.	.	.	.	D	.	.	Steady
	<i>Sterculia apetala</i>	Bark	Quin	.	.	.	.	.	D	.	.	Steady
	<i>Strophanthus</i>	Bark	Strophanthine	.	.	.	.	.	D	.	.	Steady
	<i>Strophanthus</i>	Seeds	strophanthidine	.	.	.	.	.	D	.	.	Up
	<i>Strychnos nuxvomica</i>	Seeds	Strychnine	.	.	.	.	.	D	.	.	Steady
	<i>Tamarix libani</i>	Stem bark	Ibogaine	.	.	.	.	.	D	.	.	Steady
	<i>Taraxacum officinale</i>	Root	Resin and Total extract	.	.	.	.	.	D	.	.	Steady
	<i>Thespesia populifolia</i>	Seeds	Peruovoside	.	.	.	.	.	D	.	.	Steady
Cardiotonic	<i>Uginea indica</i>	Bulbs	Procillaridine	.	.	.	.	.	C	.	.	Steady
	<i>Valeriana officinalis</i>	Rhizome	Total extract	.	.	.	.	.	C	.	.	Steady
	<i>Valeriana officinalis</i>			.	.	.	.	.	C	.	.	Steady
	<i>Valeriana officinalis</i>			.	.	.	.	.	C	.	.	Steady
	<i>Valeriana officinalis</i>			.	.	.	.	.	C	.	.	Steady
	<i>Valeriana officinalis</i>			.	.	.	.	.	C	.	.	Steady
	<i>Valeriana officinalis</i>			.	.	.	.	.	C	.	.	Steady
	<i>Valeriana officinalis</i>			.	.	.	.	.	C	.	.	Steady
	<i>Valeriana officinalis</i>			.	.	.	.	.	C	.	.	Steady
	<i>Valeriana officinalis</i>			.	.	.	.	.	C	.	.	Steady

A = Steam distillation; B = Water extraction; C = Alcohol extraction; D = Extraction with other solvents

SOURCE: UNIDO publication ID/WG-271/6

TABLE II - IX - B

DEVELOPING COUNTRIES MEDICINAL PLANT MATERIAL EXPORTS TO THE EEC AND THE USA

ORIGIN \ DESTINATION	EEC COUNTRIES (Tons)	USA (Kgs)	ORIGIN \ DESTINATION	EEC COUNTRIES (Tons)	USA (Kgs)
TURKEY	1,054	1,920,407	JAMAICA		1,668,594**
MOROCCO	2,952		SYRIA	395	
ALGERIA	51		IRAN	1,260	681,737
TUNISIA	99		PAKISTAN	217	417,536
EGYPT	2,097		INDIA	10,073	858,643**
ISRAEL			CHINA	5,698	58,158,899**
SUDAN	722		KOREA, REPUBLIC OF	936	
CAMAROO	2,685		NOT DISCLOSED*	19,743	1,052,060
ZAIRE	2,255				
RAWANDA	943				
BURUNDI	165				
MADAGASCAR	979				
MEXICO	258		83,774		
GUATEMALA	144				
ECUADOR	650				
PERU	396				
CHILE	333	480,668**			
ARGENTINA	4,170				

Source: 1. European Communities Statistical Office, CST Vol. 1 Countries/Products (Luxemburg).  
 2. United States Department of Commerce, Bureau of the Census, U.S.

\* Countries and territories not disclosed for commercial reasons.

\*\* Included natural crude drugs.

\*\* Including natural crude drugs



T A B L E II - X  
MEDICINAL PLANT DRUGS SUITABLE AND RECOMMENDED FOR PRODUCTION BY DEVELOPING COUNTRIES

Therapeutic Group	Plant	Active Constituent	Therapeutic Group	Plant	Active Constituent
Anesthetics, antipyretics	<i>Papaver somniferum</i>	Morphine, Codeine	Diuretics	<i>Theobroma cacao</i>	Theophylline
Anti-arrhythmic	<i>Cinchona sp.</i>	Quinidine		Drugs acting on the respiratory tract	<i>Ephedra Gerardiana</i> (Ephedra vulgaris)
Anti-diarrhoeal	<i>Rauwolfia serpentina</i> *	Alkaline	"	<i>Ephedra nebrodensis</i>	"
Antihypertensive	<i>Berberis aristata</i>	Berberine	"	<i>Theobroma cacao</i>	Theophylline* (as aminophylline)
"	<i>Rauwolfia serpentina</i>	Reserpine	Gastrointestinal drugs	<i>Papaver somniferum</i>	Total alkaloids or hyoscyamine
"	<i>Rauwolfia vomitoria</i>	"	Hormones	<i>Duboisia myoporoides</i>	Diosgenin*
"	<i>Rauwolfia Coniferifloratum</i>	Raubasine	"	<i>Dioscorea floribunda</i>	"
"	<i>Catharanthus roseus</i>	Vincamine	"	<i>Dioscorea composita</i>	"
"	<i>Catharanthus lanceus</i>	"	"	<i>Costus speciosus</i>	"
"	<i>Vinca minor</i>	"	"	<i>Solanum leciniatum</i>	Solanidine*
"	<i>Voacanga africana</i> *	"	"	<i>Solanum khasianum</i>	"
"	<i>Voacanga thourailii</i> *	"	"	<i>Solanum xanthocarpum</i>	"
Anti-infective	<i>Cephaelis Ipecacuanha</i>	Emetine	Lasatives	<i>Agave sisalana</i>	Mecoginin*
Antimigraine	<i>Claviceps purpurea</i>	Ergotamine	Muscle relaxants (peripherally acting) and antispasmodics	<i>Plantago ovata</i>	Glycyrrhetic acid and extract*
Antineoplastic	<i>Catharanthus roseus</i>	Vinblastine	"	<i>Physostigma venenosum</i>	Physostigmine
Antiparkinsonism	<i>Catharanthus lanceus</i>	Vincristine	Monoteroidal anti-inflammatory drugs and anti-cough drugs	<i>Vernonia</i>	Colchicine
Antiprotocol	<i>Mucuna pruriens</i>	L-Dopa	Ophthalmological preps.	<i>Chondrodendron tomentosum</i>	Phyostigmine
Antispasmodics	<i>Cinchona sp.</i>	Quinine	Daytoxic	<i>Claviceps purpurea</i>	Ergometrine
"	<i>Atropabelladonna</i>	Total alkaloids			
"	<i>Atropa acuminata</i>	Atropine or hyoscyamine			
"	<i>Datura sanguinea</i>	"			
"	<i>Datura stramonium</i>	"			
"	<i>Datura metel</i>	"			
"	<i>Hyoscyamus muticus</i>	"			
"	<i>Hyoscyamus niger</i>	"			
"	<i>Physochlaina prealta</i>	"			
Anti-ulcer	<i>Glycyrrhiza glabra</i>	Glycyrrhetic acid and extract			
Cardiotonic	<i>Digitalis lanata</i>	Digoxin and Lanatosides			
Cathartics	<i>Cassia angustifolia</i>	Sennosides mixture or sennosides A and B as such			
"	<i>Cassia italica</i>	"			
"	<i>Cassia acutifolia</i>	"			
Dermatological preparations	<i>Amal majus</i>	Xanthoxin			
	<i>Centella asiatica</i>	Asiaticoside			

\* Provides raw materials for drug production

TABLE - II - XI

## TECHNOLOGIES REQUIRED TO PRODUCE RECOMMENDED MEDICINAL PLANT DERIVED DRUGS. PATENT STATUS

PLANT	PRODUCT	BRIEF PROCESS TECHNOLOGY DESCRIPTION	PATENT STATUS*
ATROPA BELLADONA	ATROPINE	THE POWDERED BELLADONA LEAF IS CHARGED INTO PERCOLATOR, WASHED WITH ALCOHOL, FOR COMPLETE EXTRACTION OF ALKALOIDS. THE EXTRACT IS CONCENTRATED INITIALLY AT ATMOSPHERIC PRESSURE AND THEN UNDER VACUUM TO RECOVER THE SOLVENT.	<ul style="list-style-type: none"> <li>• G. VELESCU "ATROPINE SULPHATE" ROMANIAN PATENT NO 51512 DATED 30.9.67</li> <li>• Y.V. KHOSTENKO "ATROPINE SULPHATE" USSR PATENT NO 229530 DATED 27.2.67</li> <li>• S.A. ELGAZIN "PURE ATROPINE BASE" USSR PATENT NO 306127 DATED 3.11.69</li> </ul>
CINCHONA	QUININE QUINIDINE	THE FINELY POWDERED BARK IS MIXED WITH SLAKE LIME +5% AQUEOUS SOLUTION OF SODIUM HYDROXIDE. THE MIXTURE IS EXTRACTED WITH HOT TOLUENE IN STEAM JACKETED VESSELS. THE EXTRACT IS TREATED WITH HOT DILUTE SULPHURIC ACID TO CONVERT THE ALKALOIDS INTO THEIR SULPHATES. THE QUININE SULPHATE CRYSTALLIZES OUT ON COOLING.	
GLYCYRRHIZA	TOTAL EXTRACT	THE ROOTS, EITHER GREEN OR DRIED ARE CONVERTED INTO 3 cm CHIPS AND EXTRACTED AT 75° TO 85° IN A ONE COLUMN DIFFUSION TOWER. THE LIQUORICE LIQUOR FLOWS FROM THE BASE OF THE COLUMN TO A TRIPLE-EFFECT VACUUM EVAPORATOR, THEN TO A FALLING FILM EVAPORATOR AND FINALLY TO A MATTER OF AIR-COOLED CONTINUOUS MOLDING MACHINE.	
SENNA	SENNOSEIDE	SENNA LEAF POD IS EXTRACTED AT ROOM TEMPERATURE WITH A SUITABLE SOLVENT. THE EXTRACT IS TREATED WITH A CALCIUM SALT TO PRECIPITATE CALCIUM SENNOSESIDES.	
VALERIANA	TOTAL EXTRACT		
DATURA	HYOSCINE	THE GROUND ROOT IS EXTRACTED WITH AN ORGANIC SOLVENT. AMMONIA AND CHLOROFORM ARE ADDED TO THE FILTERED EXTRACT, AND THE SOLUTION IS PASSED THROUGH A COLUMN OF POLYAMIDE RESIN. THE RESIN IS THEN ELUTED WITH CHLOROFORM AND THE RESERPINE IS OBTAINED BY RECRYSTALLIZATION FROM THE ELUATE.	<ul style="list-style-type: none"> <li>• "RESERPINE" RUSSIAN PATENT NO 214741 DATED 3.3.67</li> <li>• "SEPARATION AND PURIFICATION OF ALKALOIDS" JAPANESE PATENT NO 15364, DATED 14.10.60</li> <li>• "RESERPINE" US PATENT NO 2833771, DATED 6.5.68</li> </ul>
DIGITALIS	DIGOXIN	THE LEAVES ARE SPREDED INTO 1 cm AND 1 TON OF LEAF PIECES IS LOOSELY PACKED INTO A 1 m SILO. WARM MOIST AIR IS BLOWN INTO THE SILO AT INTERVALS TO MAINTAIN OPTIMUM CONDITIONS FOR GROWTH OF MICRO-ORGANISM AND THE MATERIAL IS FERMENTED FOR FOUR DAYS, AFTER WHICH DIGOXIN CAN BE ISOLATED BY KNOWN METHODS.	<ul style="list-style-type: none"> <li>• GDR PATENT NO 94363 DATED 12.12.72</li> <li>• FRG PATENT NO 2943790</li> <li>• US PATENT NO 4021546 DATED 3.3.77</li> </ul>
DIOSCOREA	DIOGENIN	DIOGENIN IS ISOLATED BY ACID HYDROLYSIS OF THE SAPONINS WITHIN THE PLANT TISSUE FOLLOWED BY SOLVENT EXTRACTION OF THE SAPONINS WITHIN THE PLANT TISSUE FOLLOWED BY SOLVENT EXTRACTION OF THE SAPONINS FROM THE NEUTRALIZED ACID-INSOLUBLE MATERIAL.	
AMMI MAJUS	XANTHOTOXIN	THE AMMI MAJUS SEED IS EXTRACTED WITH NORMAL HEXANE IN SOXHLET TYPE EXTRACTION UNIT, FOLLOWED DEALFYLATION, METHYLATION.	
IPECAC	EMTINE CEPHALINE		
MUCUNA	L-DOPA	PULVERISED MUCUNA PRURITA SEEDS ARE EXTRACTED WITH ACETIC ACID AND SODIUM METABISULPHITE. THE EXTRACT IS CONCENTRATED.	

\* • ALL TECHNOLOGIES ARE TRANSFERABLE.

SOURCE • UNCTAD-GATT PUBLICATION "MARKET FOR SELECTED MEDICINAL PLANTS AND THEIR DERIVATIVES", YEAR 1982.

### C. Formulation and Packaging (Note 1)

Tables II-XII A and B have been designed to present a general picture of the potential market size for formulation and packaging applied research and technical assistance activities. To eliminate duplication of data, the world market trade data (either by regions and by therapeutic groups) have been excluded from this Table, and reference has been made to Tables II-II-C, D and E. The list of raw materials and intermediates required to produce essential drugs have already been presented in Table II-I-B and II-VII. Reference to these tables has been made to avoid repetition.

The list of drugs which are recommended to be purchased in bulk by developing countries, organized by therapeutic groups<sup>1</sup> has been presented. Drugs from fermentation process, hormones, immunologicals and vitamins have been excluded, as this report deals only with those from synthetic or medicinal plant origin. Those drugs or raw materials that require special packaging have also been remarked in Table II-XII-A. Table II-XII-C presents a summary of the various types of formulation which have been used to design the formulation pilot plant. Table II-XII-B presents a summary of ancillary material required to formulate drugs.

An investigation has been performed of the technologies available for formulation and packaging with the result that most of the technologies have their patent expired or are suitable for transfer to developing countries, or are already being used by them. Formulation and packaging facilities are existing in this group of countries (2) and details of such facilities can be found in the references mentioned in the foot-note.

To fulfil the health requirements of the group of developing countries, bearing in mind the concept of economics of health, these facilities will have to be expanded and updated, and new ones will have to be installed. This programme must be done accounting for the special industrial and socio-economic circumstances of the developing countries; in some cases the extreme climatic conditions existing in some of the countries will result in specific problems that will require the development of special techniques for storage and packaging. The trade data in Tables II-II-C and E indicates that the market is big and that its dollar value is significant to make attractive the business. The variety of presentations is too wide to summarize specific programmes for formulation and packaging. These programmes should be made upon demand for each specific case.

From the above it can be concluded that there is a potential market which the ITPT Centre could service, either providing and developing specific technologies or formulating and packaging drugs for those countries which already have not such facilities. This task can be achieved the ITPT formulation and packaging pilot plant, as it has been sized for semi-industrial scale production capacity.

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Note 1- This is a consequence of points A and B above. It has not been specifically requested for in the Terms of Reference.

(2) UNIDO Publication PC-51

TABLE II-XII-A

SELECTED ESSENTIAL DRUGS SUITABLE TO BE PURCHASED IN BULK FORM		
THERAPEUTIC GROUP	DRUGS	STORAGE CONDITIONS
Analgesic	Acetylsalicylic acid	(a)
	Paracetamol	(b)
Anthelmintic	Bephenium	(b)
	Piperazine	(b)
Antibacterial	Sulphadiazine	(b)
Antifilarial	Diethylcarbamazine	(a)
Antileprotic	Dapsone	(b)
Antimalarial	Chloroquine	(b)
	Primaquine	(b)
Antituberculosis	Ethambutol	(b)
	Isoniazid	(b)
Cardiovascular	Methyldopa	(b)
	Reserpine	(b)
Diuretics	Furosemide	(b)
Antidiabetics	Tolbutamide	(b)
Oral contraceptives	Ethinylestradiol	(c)
(a) Store in airtight containers at temperature not exceeding 30°C. (b) Store in airtight containers protected from light at temperature not exceeding 30°C. (c) Store in cool place, airtight containers protected from sunlight.		

Source: Unido - PC.51

TABLE II-XII-C

DIFFERENT TYPES OF FORMULATION			
TYPE	USUAL FORM	TYPE	USUAL FORM
<u>TABLETS</u>	Plain Chewable Sugar coated Press coated Layered Film-coated Sustained-release	<u>INJECTABLES</u>	- Solution ready for injection - Suspension ready for injection - Dry solid + suitable solvent
<u>CAPSULES</u>		<u>POWDERS AND GRANULES</u>	
<u>LIQUID PREPARATION</u>	Solutions Emulsions Suspensions		
<u>OINTMENTS</u>			

Source: UNIDO - Monographs on Appropriate Industrial Technology No 10

TABLE II-XII-B

ANCILLARY PRODUCTS REQUIRED TO FORMULATE DRUGS			
TYPE	PRODUCT	TYPE	PRODUCT
<u>DILUENTS</u>	Lactose Starch Sucrose Mannitol Dicalcium phosphate Microcrystalline cellulose	<u>LUBRICANTS</u>	Talcum powder Liquid paraffin Stearic acid Calcium stearate Magnesium stearate
<u>BINDERS</u>	Gum acacia Gum tragacanth Gelatin Starch paste Sodium carboxy-methyl-cellulose	<u>EMULSIFYING AGENTS</u>	Benzalkonium chloride Glyceryl monostearate Gum acacia
	Mythyl-cellulose Ethyl-cellulose Polyvinyl pyrrolidene Sodium alginate	<u>CAPSULES</u>	Hard gelatin Soft gelatin Seamless
<u>SUSPENDING AGENTS</u>	Sodium-carboxy-methyl-cellulose Methyl-cellulose Carbopal polyacrylic acid Sodium alginate Gum acacia Gum tragacanth	<u>PRESERVATIVES</u>	Alcohol Hydroxy benzoates Sorbic acid
		<u>COLOURING AGENTS</u>	Certified food and drug colours only
		<u>FLAVOURING AGENTS</u>	Compatible products

Source: UNIDO - Monographs on Appropriate Industrial Technology - no 10

#### D. Quality Control (Note 1)

The ITPT Quality Control activities should extend to all drugs purchased and produced by the developing countries. Therefore the whole drug market has been considered. To illustrate the importance of this market, Table II-XIII indicates the actual and projected market share by developing countries. The Methodology Diagram no 4 indicates the procedure followed to calculate the minimum number of tests that could be requested by the developing countries, and therefore, the amount of sample tests that the ITPT Centre could make. Because of the variety of products and the non-availability of reliable data on quantities and shipments, it has been assumed an average price per lot of drugs. From there, the amount of lots have been calculated. It is normal good practice to make three samples per lot. Based on this, the number of samples that should be tested has been evaluated. The resulting figure has been reduced down to 5% of its value to size the initial furnishing of the ITPT Quality Control Laboratories and to evaluate the revenues that the ITPT Centre could obtain for its services in this sector.

Note 1- Specifically fulfils point 4-b-iii of the Terms of Reference.

For the initial period of activities, this conservative figure has been considered. Together with the harmonization of policies and standardization of procedure for quality control, the demand of quality control tests will increase and also the amount of services requested from the ITPT Centre, and therefore, the revenues it can expect from this sector.

TABLE II-XIII

RELATIVE IMPORTANCE OF DEVELOPED AND DEVELOPING COUNTRIES AS DRUG MARKETS (US\$ BILLIONS)				
	1.980	1.983	1.985	1.990
Developed countries	52.50	61.35	68.48	100.19
Countries with Central Economic	12.15	15.15	16.65	21.76
Developing countries	10.35	14.80	17.82	28.05
Share of Developing countries (%)	13.8	15.3	16.2	18.7

Source: IRL

E. Training and Engineering and Advisory Services (Note 1)

The Methodology Diagrams nº 5 and 6 are self-explanatory and no additional comments are required. Until a commitment is made by the developing countries for the amount and type of services they will in the sector, the capability of the ITPT Centre has been measure based in the manhour availability of its personnel.

I-4 RESULTS FROM THE MARKET SURVEY. THE ITPT CENTRE PROGRAMME

The information obtained from all the data collected and summarized in article I-3 of this Volume should be adjusted taking into account the results of the answers received to the questionnaire sent to the developing countries. So far 7 answers have been received to the 99 questionnaires sent to 99 different countries (a copy of the questionnaire has been included in the Exhibit II-1 of this Volume). The answers are received so far insufficient to develop the desired factors and therefore it has been decided to evaluate the potential market for the ITPT Centre activities based on all the former data, without adjusting it to take into account the "interest factor". Therefore, prior to implementation of the Centre,

Note 1- Specifically fulfils points 3.3, 3.5 and 4 of the Terms of Reference.

the developing countries interest in becoming members should be taken into account as well as their commitments to the type and amount of services they wish to use. The financial calculation can then be adjusted accordingly.

In addition to the above, and due to the characteristics of the Centre, it has been preferred to evaluate the Centre capabilities using the manhour method, and forecasting the sales utilizing the occupation (or sold manhours) procedure. The results of this procedure have been indicated in Volume III, Chapter II, articles II-2 and II-4 and are therefore omitted here to avoid repetition.

The ITPT programme can be outlined as follows, as a result of the qualitative market survey made before, and in response to point 3.4 of the Terms of Reference.

A- Synthetic Drugs Section

1. Carry out feasibility studies on synthetic drugs in order to establish the technical and economic factors to set up production facilities in developing countries.
2. Transfer technologies for the processes related to the production of synthetic drugs and carry out suitable studies to improve the existing processes taking into account the requirements and conditions of the individual country.
3. Carry out laboratory, pilot and semi-industrial scale processes to study the optimal operating conditions, equipment, raw materials and intermediates required in each particular case.
4. Standardize procedures and certify the quality of the products.
5. Train personnel to manage and operate industrial plants and to familiarize themselves in applied research, using the ITPT centre laboratory and semi-industrial scale pilot plants.
6. Exchange expertise.
7. Advise and assist in obtaining and providing information on pharmaceuticals and the pharmaceutical industry.

B. Medicinal Plant Derived Drugs Sector

1. Encourage and promote surveys of the potential of the flora of developing countries for their utilization as a source of plant derived pharmaceuticals.
2. Carry out feasibility studies for developing countries to see if it is feasible both technically and economically to set up production facilities for medicinal plants.

3. Assist in the transfer of technologies for the systematic cultivation of selected medicinal plant, and promote and develop new technologies or improve the existing ones, to tailor them to an individual country's conditions.
4. Carry out laboratory and pilot plant scale-ups and applied research for extraction processes, formulation and packaging of medicinal plant derived drugs, giving priority attention to those mentioned in Table II-X whose production in developing countries appears to be of immediate advantage.
5. Standardize and certify the quality of the products.
6. Train personnel and exchange expertise.

C. Formulation and Packaging Sector

1. Carry out feasibility studies to investigate the profitability of new installations and the convenience to expand or substitute the existing ones.
2. Develop special packaging systems and technologies to protect drugs and raw materials in humid and tropical climates.
3. Standardize and perform quality control of finished forms.
4. Perform scale-up tests for formulations.
5. Formulate and package drugs for those developing countries that still have no facilities.
6. Train personnel and exchange expertise.

D. Quality Control Sector

1. Standardize quality control procedures.
2. Provide quality control services for bulk drugs, intermediates, raw materials and finished forms on an industrial basis. This programme is not intended to investigate new drugs (NCE).
3. Train personnel and exchange expertise.

E. Training Sector

The programme for training activities would cover all sectors of activities of the I.T.P.T. Centre and would be carried on at the same time. It has been highlighted in paragraphs A (point 5), B (point 6), C (point 6) and D (point 3) above. The proposed duration of each training course has also been specified in Chapter II, Article III - of Volume III.

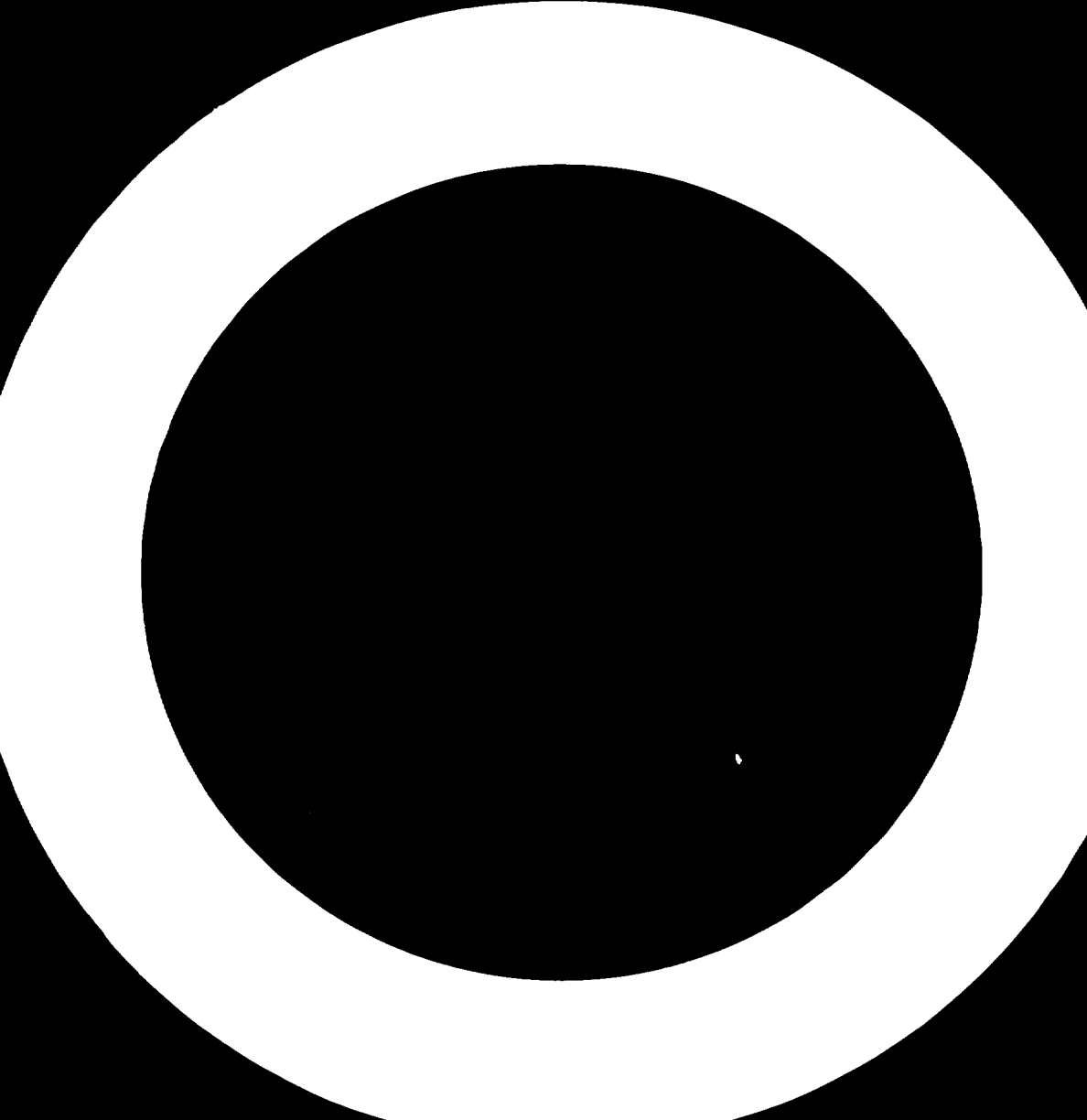


F. Engineering and Advisory Sector

The programme of activities in this sector should be extremely flexible due to the variety of problems that may arise. It will range from feasibility studies to project execution; from standardization of procedures to harmonization of policies; from assistance in negotiations for transfer of technology to management of contracts on behalf of developing countries. All the experts and departments of the I.T.P.T. Centre may be involved in most of these services in many instances. Therefore it has been preferred to highlight the most relevant points of these programmes within the programme outlined for the other sectors. To summarize, points 1, 2, 4, 6 and 7 of paragraph 1-4-A, points 1,2,3,5 and 6 of paragraph 1-4-B, points 1, 3, and 6 of paragraph 1-4-C and points 1 and 3 of paragraph 1-4-D above, indicate specific activities of the Engineering and Advisory group.

G. Information Sector

The I.T.P.T. information sector would provide information on the pharmaceutical industry all over the world, drugs prices and market trends, new products and technologies, sources of products, techniques, equipment and information. It should collect and inform of the results of the I.T.P.T. Centre operation and achievements. Its computerize library should be connected to the international system of information. Books and periodical publications should be obtained and extracted to offer to member countries a quick source of information on all subjects related with the pharmaceutical industry.



THE ITPT ACTIVITIES AND PROGRAMME

This chapter responds to point 4-a of the Terms of Reference.

A. Proposed Activities

To achieve the objectives required, and as a result of the market survey, the IPTP Centre could perform the following activities:

I. Process and Applied Technology Research and Development Activities

The initial activities should be dedicated to applying existing technologies to the specific conditions of Developing Countries. This may include technologies to commence production or to improve and update existing production techniques. This applied research should be done at a laboratory pilot plant scale and at a semi-industrial pilot plant scale.

Activities should be directed towards adapting existing and available technologies which need some research prior to being applied to the specific technical and economical conditions of the developing countries and towards those technologies which have to be rationalized to make them suitable for transfer to the developing countries. At a further stage, the ITPT Centre could develop those technologies which are not transferable and are still needed in the developing countries to utilize their potential in some raw materials or to reduce the cost of their health care programme.

Three main groups of activities should be performed by the ITPT Centre in this regard:

- a) The applied research on basic and/or on profitable drugs obtained by synthesis.
- b) The applied research on formulation and packaging technologies, especially those connected with packaging methods to protect drugs and raw materials in hot tropical climates and to allow the use of local packaging materials.
- c) The applied research on extraction and formulation of drugs derived from medicinal plants. In connection with this, the identification of existing proven technologies and of the requirements to transfer this to developing countries, or the development and/or upgrading of such technologies to make them useful to developing countries, should be a priority activity.

The above activities could create the back-bone of applied research and development for the pharmaceutical industry in developing countries which could reduce the investment that each of those countries would have to make on its own in order to obtain the same results.

2. Analytical and Quality Control Activities

These activities should be undertaken to assure developing countries that the quality of the drugs and raw materials they buy or produce meets either international standards and/or specified conditions. It should be confined to the methods of analysis on an industrial level, and not for analysing existing pharmaceutical products or conducting technical audits of industrial units to develop new specifications.

3. Technical Assistance Activities

These activities should be aimed at the technical aspects for the production of synthetic and medicinal plant drugs. For example the transfer from pilot plant scale and semi-industrial scale to industrial plant scale can be made using the Centre facilities. Trouble-shooting and advisory services for setting up industrial plants in developing countries is another activity that the ITPT Centre could do as well as the preparation of feasibility studies and the design of pharmaceutical units.

4. Information Activities

These activities would concentrate on providing complete and extensive information on pharmacotechnology, pharmaceutical chemistry, unit processes, quality control standards, specifications, prices, trade data, raw materials, technologies, sources of technology, product and raw material suppliers, markets, market trends, patents, legal information, health and production programmes, and results of the work of the Centre.

5. Training Activities

Training activities should deal with teaching personnel from developing countries in the areas of information handling and research, quality control analysis, synthesis and extraction, plant operation at pilot scale, formulation and packaging, medicinal plant cultivating methods and applied technology research.

B. Services Programme

As a result of the activities that the Centre could perform, the Management and the Coordination and Planning Unit of the Centre must prepare a detailed programme and continuously updated schedule for each activity of the Centre. Such programme of activities must include, as a minimum, the following:

1. Information Programme

- a. Technical area
    - a.1 Pharmacotechnology
    - a.2 Pharma-Chemistry
    - a.3 Unit processes
    - a.4 Quality assurance and specification. Stability. Specifications and methods of analysis.
    - a.5 Pharmacology
    - a.6 Engineering
    - a.7 Raw materials
    - a.8 Packaging materials techniques
    - a.9 Sources of technology
  - b. Commercial area
    - b.1 Prices of raw, intermediate and finished materials.
    - b.2 Suppliers
    - b.3 Markets and market trends
  - c. Legal area
    - c.1 Patent status
    - c.2 Methods of negotiation of contracts
    - c.3 Contract forms
2. Advisory Services Programme
    - a. Evaluation and feasibility studies
    - b. Audits
    - c. Solution of specific problems in pharmaceutical areas, raw materials, etc.
  3. Training and Technical Assistance Programme
    - a. Training programmes

These should take place at the Centre or at places set up by the Centre for all the activities of the Centre.
    - b. Availability of expertise
      - . Experts available for solving problems linked with the technologies developed by the Centre (permanent, or from a list developed by the Centre). This program must be tied to and connected with the Advisory Services Programme.
  4. Applied Research and Development Activities Programme
    - a. Application of the existing technologies to specific problems and conditions.

- b. Improvements in existing technologies.
  - c. Raw materials. Replacement of traditional by local materials.
  - d. Rationalization of operations, covering processes involving energy usage and recovery, by-product recycling, solvent recovery, medicinal plants cultivation and storage, etc.
5. Semi-Industrial Scale Pilot Plants and Applied Research Programme and Scaling Up
- a. Synthesis
  - b. Extraction from medicinal plants
  - c. Formulation
  - d. Packaging
6. Analytical and Quality Control Laboratories Programme
- a. Chemistry and Pharmacy
  - b. Botanical
  - c. Pharmacology
  - d. Microbiology
7. Medicinal Plants Research Programme
- a. Cultivation methods improvement
  - b. Plant taxonomy
  - c. Research to permit medicinal plant cultivation in different climates
  - d. Efficiency improving cultivation methods in cooperation with other International Organizations
  - e. Plant and plant product storage techniques

The time scheduling of these suggested programmes, as well as the expansion or reduction of the same, will have to be decided and updated by the Management of the Centre, in accordance with the operational results.

THE ITPT FACILITIES DESCRIPTION

III-1 THE ORGANIZATION AND STAFF OF THE CENTRE

This Article responds to points 4-b, c and d of the Terms of Reference.

1. MANAGEMENT FUNCTIONS DESCRIPTION

a. Corporate Control Level  
(Honorary Board of Directors)

This would consist of representatives of several member countries, UNIDO and the Host Country, who in accordance with the statutes of the Centre, would exercise operative control over the Centre. Host Country majority would be desirable. Their status would be honorary and the members would not receive any regular salary.

b. General Director

This person must cover all organizational aspects and be responsible for the attainment of the objectives. He could be designated by UNIDO, and have extensive experience and internationally recognized qualifications.

c. Administrative Level

This level would consist of a Personnel Manager, a Sales and Finance Manager and a Legal Advisor. They would be responsible for their respective functions.

d. Technical Management

A Technical Manager would be responsible for all of the technical aspects of the Centre such as develop an overall plan for the Quality Control and research and development activities as well as the direction and goals of co-ordinated departmental research, as well as evaluating existing facilities, equipment and services. He must have wide and proven experience in his full and must also have a capacity for channelling the enquiries and specific

knowledge of the area managers. He must maintain contact with those advisors whom the Centre appoints to carry out tasks of technical assistance and to solve problems in the various areas of activity of the Centre. He should also have internationally recognized qualifications.

e. Technical Area Managers

Under the general supervision of the Technical Manager, the technical area managers will carry out everything related to their speciality, with personnel at lower level reporting directly to them. They will periodically report their findings and, when required, they will issue the pertinent reports. They will be responsible for the administration of their area, supporting the administrative manager so that the latter can summarize all the non-technical activities in his reports and accounts.

The following is a breakdown of the Technical Area Managers:

<u>Section</u>	<u>Required Technical Managers</u>
Chemistry + Instrument Laboratory	one
Microbiology Laboratory	one
Pharmacology Laboratory + Animal Breeding Facility	one
Synthetic Pilot Plant + Supporting Laboratory and Medicinal Pilot Plant + Supporting Laboratory + Green House.	one
Formulation Pilot Plant + Supporting Laboratory	one
Industrial Consulting Unit	one

All these people must be specialized in their respective field, and have capacity to execute the proposed programmes of their section and manage the staff working in their section.

The following Organization Chart indicates the linkage among the members of the staff of the Centre.

2. DETAILED BREAK-DOWN OF THE STAFF FOR EACH ALTERNATIVE

The following Table II-XIV summarizes the detailed break-down of the staff for the Base Case and each Alternate analyzed. Definition of the Base Case and each Alternate has been given in Volume I, Chapter I, Article I-10 and in article III-2 of this Chapter.



# ORGANIZATION CHART

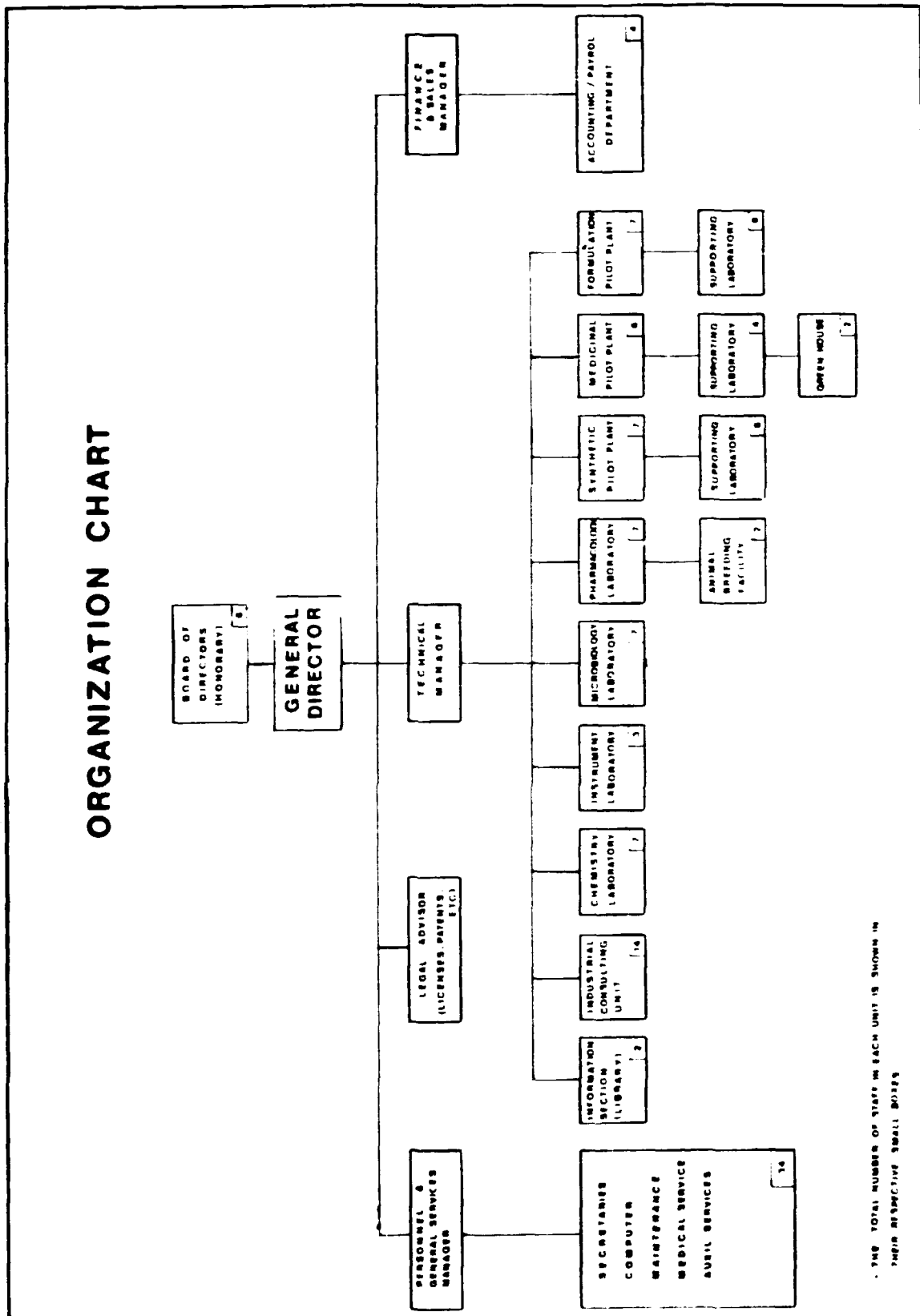


TABLE - II - XIII

DETAILED BREAKDOWN OF THE STAFF FOR THE VARIOUS ALTERNATIVES

Position	Base Case	Alternative no 1 Synth.Pilot Plant	Alternative no 2 Medic.Pilot Plant	Alternative no 3 Formul.& Pack. Quality Control Eng. & Advisory Training	Position	Base Case	Alternative no 1 Synth.Pilot Plant	Alternative no 2 Medic.Pilot Plant	Alternative no 3 Formul.& Pack. Quality Control Eng. & Advisory Training
<b>A. MANAGEMENT</b>					<b>C. TECHNICAL STAFF</b>				
Board of Directors (Honorary) *	6 *	6 *	6 *	6 *	<b>1. ANALYTICAL/QUALITY CONTROL UNIT</b>				
Director	1	1	1	1	<b>a. Chemistry Laboratory</b>				
Personnel & Gral. Services Manager	1	1	1	1	Unit Chief	1	-	-	1
Finance & Sales Manager	1	1	1	1	Senior Chemists (PhD level)	2	-	-	2
Technical Manager	1	1	1	1	Lab. Technicians (ME level)	3	-	-	3
Legal Advisor	1	1	1	1	Lab. Assistant (IG level)	1	-	-	1
<b>Total Managers .....</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>Sub-Total .....</b>	<b>7</b>	<b>-</b>	<b>-</b>	<b>7</b>
<b>B. AUXILIARY STAFF</b>					<b>b. Instrument Laboratory</b>				
Accounting/Payroll Chief	1	1	1	1	Senior Chemist (PhD level)	1	-	-	1
Senior Accountant	1	1	1	1	Technicians (ME level)	2	-	-	2
Junior Accountants	2	2	2	2	<b>Sub-Total .....</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>3</b>
Computer Analyst Program	2	1	1	1	<b>c. Microbiology Lab.</b>				
Secretaries (Managerial plus Departments)	9	6	6	7	Unit Chief	1	-	-	1
Receptionist	2	2	2	2	Senior Microbiologists (PhD level)	2	-	-	2
Telephone Operator	1	1	1	1	Lab. Technicians (ME level)	3	-	-	1
Mechanic	1	1	1	1	Lab. Assistant (IG level)	1	-	-	1
Electrician & Instrumentalist	1	1	1	1	<b>Sub-Total .....</b>	<b>7</b>	<b>-</b>	<b>-</b>	<b>7</b>
Assistants (Electric & Mechanic)	2	2	2	2	<b>d. Pharmacology Lab.</b>				
Medical Assistance (Nurse First Aid)	1	1	1	1	Unit Chief	1	-	-	1
Utilities Controller	1	1	1	1	Senior Pharmacologist (PhD level)	2	-	-	2
Store House Assistants	3	2	2	2	Lab. Technician (ME level)	3	-	-	3
Washing Room (Laboratory)	3	1	1	1	Lab. Assistant (IG level)	1	-	-	1
Attendants	4	2	2	2	<b>Sub-Total .....</b>	<b>7</b>	<b>-</b>	<b>-</b>	<b>7</b>
Cafeteria **	6	6	6	6	<b>Feasibility Study I.T.P.T. Centre</b>				
Guards (Security) ** per shift	4	4	4	4					
Maintenance & Cleaning**	8	4	4	6					
<b>Total Auxiliary staff ..</b>	<b>34</b>	<b>25</b>	<b>25</b>	<b>26</b>					

\* Not totalized nor accounted in operating cost evaluation, as they do not perceive any regular reward from the ITPT budget.

\*\* Not totalized as staff; their cost has been included as "Subcontracted Services" in the evaluations.

TABLE II-XIII (Cont.)

DETAILED BREAKDOWN OF THE STAFF FOR THE VARIOUS ALTERNATIVES

Position	Base Case	Alternative no 1 Synth. Pilot Plant	Alternative no 2 Medic. Pilot Plant	Alternative no 3 Formul. & Pack. Quality Control Eng. & Advisory Training
<b>e. Animal Breeding Facil.</b>				
Veterinary Assistant	1	-	-	1
Assistant	1	-	-	1
Sub-Total	2	-	-	2
<b>2. PILOT PLANTS</b>				
<b>a. Synthetic Pilot Plant</b>				
Unit Chief	1	1	-	-
Senior Chemist/Engineer (pH level)	2	2	-	-
Technician/Operators (MS level)	1	1	-	-
Assistant Technician (BS level)	3	3	-	-
Sub-Total	7	7	-	-
<b>a. Supporting Lab. Synthetic Pilot Plant</b>				
Senior Chemist/Engineer (pH level)	2	2	-	-
Technician (MS level)	2	2	-	-
Assistant Technician (BS level)	2	2	-	-
Sub-Total	6	6	-	-
<b>b. Medicinal Pilot Plant</b>				
Unit Chief	same as Staff	-	1	-
Senior Chemist/Engineer (pH level)	2	-	2	-
Technician (MS level)	2	-	2	-
Assistant Technician (BS level)	2	-	2	-
Sub-Total	6	-	7	-
<b>b. Supporting Lab. Medicinal Pilot Plant</b>				
Senior Chemist (pH level)	1	1	1	1
Technician (MS level)	1	1	1	1
Assistant Technician (BS level)	1	1	1	1
Production operators (MS level)	3	3	3	3
Sub-Total	6	6	6	6
<b>3. INDUSTRIAL CONSULTING UNIT</b>				
Unit Chief	1	-	-	-
Engineers	4	1	1	1
Marketing Analysts	2	1	1	1
Planner	1	1	1	1
Chemist	1	-	-	-
Pharmatologist	1	-	-	-
Examiner	1	1	1	1
Draftsman	3	1	1	1
Sub-Total	16	6	6	6
<b>4. INSTRUCTIONAL UNIT</b>				
Literation Assistant	1	1	1	1
Assistant	1	-	-	-
Sub-Total	2	1	1	1
TOTAL TECHNICAL STAFF	85	22	22	60
TOTAL STAFF	174	52	52	91

III-2 THE BUILDING DESCRIPTION AND ITS INSTALLATIONS

This article responds to point 4.e of the Terms of Reference.

BASE CASE (INTEGRATED FACILITIES)A. The Building Description

The following paragraphs describe the facilities for the International Centre for Information, Training and Development of Pharmaceutical Technology (ITPT) as required to perform the activities defined before.

The building itself has been divided into six (6) levels in which the various activities of the Centre are performed. Two levels are below ground (basement) and four are above ground (ground floor, first, second and third floor),

External siding consists of glass curtain walls of aluminium framing which gives complete flexibility for the distribution of the various areas on each level. To highlight the main entrance a recess has been made in the outside wall and the main stairway has been positioned there.

The overall dimensions of the building are forty eight (48) meters by twenty three (23) meters, resulting in an area of one thousand, one hundred and four (1104) square meters.

The floor below the ground level , whose area is 1104 square meters, contains the following:

Raw Material Store	160	square meters
Sterile Fill Room	30	square meters
Liquid Filling Room	18	square meters
Capsulation Room	18	square meters
Powders Room	18	square meters
Medicinal Plant Drug Preparation Room	18	square meters
Quarantine Room	48	square meters
Finished Product	100	square meters
Packaging Area	130	square meters
General Services	108	square meters
Changing Room	59	square meters
Toilets	25	square meters
Pilot Plant	196	square meters

The floor below this , whose area is 1104 square meters contains the following:

Air Conditioning Equipment Area	97	square meters
Toilets	25	square meters
Control Room	6	square meters
Worksoh & Storage	60	square meters
Parking area	840	square meters

The ground floor, whose area is 1010 square meters, contains the following:

Auditorium	153	square meters
Offices for Managers	432	square meters
Pilot Plant	196	square meters
Toilets	25	square meters

The first floor, whose area is 1010 square meters, contains the following:

Room for Utensils	6	square meters
Washing Room	6	square meters
General Storage Area	26	square meters
Instrument and Weighing Room	36	square meters
Chemistry Laboratory	90	square meters
Microbiology Laboratory	90	square meters
Pharmacology Laboratory	90	square meters
Animal Breeding Area	117	square meters
Toilets	25	square meters
Pilot Plant	322	square meters

The second floor, whose surface area is 1010 square meters, contains the following;

Kitchen and Food Storage Area	80	square meters
Cleaning Room	12	square meters
Cafeteria	180	square meters
Technology Laboratory	90	square meters
Instrument Room	36	square meters
Classroom	170	square meters
Library	135	square meters
Librarian's Office	12	square meters
Storage Area	12	square meters
Computer Terminal Area	11	square meters
Toilets	25	square meters
Synthetic Drugs Laboratory	90	square meters

The third floor, whose surface area is 1104 square meters, contains the following:

General Director Office	84	square meters
Meeting Room	96	square meters
Legal Department	54	square meters
Technical Manager Office	81	square meters
Administration, Purchasing and Sales	216	square meters
Medicinal Plants Laboratory and Culture Area	207	square meters
Computer	90	square meters
Toilets	40	square meters

A central opening in the main corridor and skylight allows natural light to enter to all levels of the building. The building is fully air conditioned and provided with an automatic fire protection system.

**B. The Building Installation and Centralized Services****1. The Utilities required in the building are the following:****a. Electrical Power for:**

- Lighting
- Electrical motors
- Electrical devices of equipment

**b. Domestic Water for:**

- Drinking water
- Hot domestic water
- Hot water for heating systems
- Pilot plants and laboratories requirements
- Fire water

**c. Cooling Water for:**

- Pilot plant requirements
- Air conditioning system requirements

**d. Chilled Water for:**

- Pilot plant requirements and air conditioning system

**e. Brine for:**

- Pilot Plant requirements

**f. Steam for:**

- Pilot plant requirements
- Hot domestic water
- Hot water for heating systems
- Distilled and sterile water production

The Steam Generation Unit will include facilities to produce demineralized water for process and laboratory usage and steam production

**g. Compressed Air (Oil free and dried) for:**

- Pilot plant requirements
- Instrument air

**2. Centralized services for certain building installations have been foreseen, as follows:**

- a) Air Conditioning (water chilling plant and cooling tower)
- b) Water Treatment Facilities
- c) Distilled Water Production Unit
- e) Steam Generation System
- f) Compressed Air Plant
- g) Brine Chilling Plant
- h) Solvent Facilities

Services such as Nitrogen, Vacuum, Ethilene-oxide, and stabilized electric power supply will not be centralized. They will be individually provided to each user area.

The Host Country could provide the following services in order to facilitate the operation of the Centre (and invoice them to the Centre):

- Treated effluent discharge connections to existing municipal sewage system.
- Telephone connection to the international telephone network.
- Computer connection to the Host Country computer network, tied to the international data network.
- Domestic water supply connection
- Electrical power supply connection

#### ALTERNATE 1 - SYNTHETIC DRUGS PILOT PLANT

##### A. The Building Description

In this alternate the building has been divided into two main areas: Administrative and Social Section and Working Section respectively.

The dimensions of the Administrative and Social Section are forty five (45) meters by seventeen (17) meters.

The dimensions of the working section are thirty six (36) meters by twenty five (25) meters.

Both Sections are interconnected by means of corridors, resulting in a total area of one thousand, eighth hundred (1.800) square meters.

The division and distribution of each section is as follows:

The ground floor, whose area is 1.800 square meters contains the following.

Pilot Plant	300	square meters
Raw Materials Storage	165	square meters
Finished Product Storage	165	square meters
Locker (Men)	66	square meters
Locker (Women)	66	square meters
Cafeteria-Restaurant	255	square meters
Auditorium	170	square meters
Reception Hall	255	square meters
Toilets, Stairs, Corridors, etc.	358	square meters

The first floor, whose area is 1800 square meters, contains the following:

Pilot Plant	300	square meters
Chemistry Laboratory	77	square meters
Pharmacology Laboratory	77	square meters
Animal Breeding	77	square meters
Microbiology Laboratory	77	square meters
Formulation Laboratory	77	square meters
Supporting Laboratory	77	square meters
Manager's Area	255	square meters
Class Rooms	60	square meters
Library	150	square meters
Medical Services	60	square meters
Hall	144	square meters
Toilets, Corridors, Stairs, etc.	369	square meters

The second floor, whose area is 900 square meters, contains the following:

Management Area	150	square meters
Legal Department	60	square meters
Meeting Rooms	75	square meters
Administration and Financing	250	square meters
Hall	144	square meters
Toilets, Corridors, Stairs, etc.	221	square meters

The floor below the ground level, whose area is 300 square meters, contains the following:

Utilities	200	square meters
Workshop	100	square meters

B. The Building Installations and Centralized Services

The concept applied is the same as for the Base Case.



ALTERNATE 2 - MEDICINAL PLANTS PILOT PLANTA. The Building description

The building has also been divided in two main areas: Administrative and Social Section and Working Section respectively.

The dimensions of the Administrative and Social Section are, thirty six (36) meters by fifteen (15) meters.

The dimensions of the Working Section are thirty (30) meters by twenty (20) meters.

B. The Building Installations and Centralized Services

The concept applied is the same as for the Base Case

ALTERNATE 3 - QUALITY CONTROL, FORMULATION AND PACKAGING, INFORMATION AND ADVISORY SERVICESA. The Building Description

The building has also been divided in two main areas: Administrative and Social Section and Working Section respectively.

The dimensions of the Administrative and Social Section are, forty one (41) meters by fifteen (15) meters.

The dimensions of the Working Section are thirty three (33) meters by twenty five (25) meters.

Both Sections are interconnected by corridors, resulting in a total area of one thousand, five hundred, thirty nine (1539) square meters.

The division and distribution of each Section is distributed as follows:

The ground floor, whose area is 1539 square meters, contains the following:

Pilot Plant	300	square meters
Raw Materials Storage	110	square meters
Finish Product Storage	110	square meters
Formulation Supporting Laboratory	88	square meters
Lockers	88	square meters
Auditorium	150	square meters
Reception Hall	180	square meters
Cafeteria	225	square meters
Toilets, Corridors, Stairs, etc.	288	square meters

The first floor, whose area is 1539 square meters, contains the following:

Managers Area	210	square meters
Library	195	square meters

Medical Services	45	square meters
Pharmacology Laboratory	77	square meters
Microbiology Laboratory	77	square meters
Chemistry Laboratory	77	square meters
Research and Development Laboratory	77	square meters
Instrument Room	44	square meters
Consulting Office	77	square meters
Drafting Area	66	square meters
Computer Area	99	square meters
Hall	120	square meters
Toilets, Corridors, Stairs, etc.	375	square meters

The second floor, whose area is 615 square meters, contains the following:

General Direction	135	square meters
Administration and Finances	210	square meters
Legal Department	45	square meters
Hall	110	square meters
Toilets, Corridors, Stairs, etc.	115	square meters

The floor below ground level, whose area is 300 square meters, contains the following:

Utilities	204	square meters
Workshop	96	square meters

#### B. The Building Installation and Centralized Services

The concept applied is the same as for the Base Case.

#### III-3 EQUIPMENT LIST

This Article responds to point 4.e of the Terms of Reference.

The following Equipment List specifies the minimum requirements to operate the Centre, based in the activities that it has to perform to achieve its objectives. The list has been used to size the building and to arrive to an accurate estimate of the investment cost. The list has been included here for information and could be expanded, (but it is unlikely that it could be reduced), in accordance to the final decision for the Centre.

The complete list applies to the Base Case (one single building housing all facilities). Those items of equipment which apply to only one or several of the alternatives are indicated in the left hand column "Applicable to Alternative". Identification is as follows:

- For Alternative 1: a 1 figure will be used.
- For Alternative 2: a 2 figure will be used.
- For Alternative 3: a 3 figure will be used.

**Note:** Quantity required means total quantity stated for Base Case and for each Alternate noted in left hand column, unless otherwise specified in the column.

EQUIPMENT LISTA. CHEMISTRY LABORATORY

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
1,2,3	1	PH Meter	2	PH Measuring range: 0-14 Temp correction: Automatic Stability indication: Autoread
	2	Polarimeter	1	Perking-Elmer 241 MC
	3	Melting Point Apparatus	1	It should be electrothermal type with thermometer range 20° to 360° C complete with 100 capillary tubes (closed both ends) 100 x 1.5 - 2.0 mm and with bottle or graphite
	4	Viscosimeter with thermostate	1	Be suitable for kinematic viscosity determination. - Should have accurate electronic circuit - Should have over temperature cut out system. - Temp. range: 10° - 120°C - Dimensions (approx.) 670 x 320 x 610 mm - Temperature control must be better than $\pm 0.01^\circ\text{C}$ through out range. - Should accompany all necessary accessories essential for viscosity test.
	5	Densitometer	1	It should be able to measure density of liquids and solids. Measuring range: 0 - 1.999 G/cm <sup>3</sup> .
	6	Oscillatory Shaker for Tubes	2	- RPM 47 approximately

CHEMISTRY LABORATORY

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
1,2,3	7	Multimagnet mix	2	<ul style="list-style-type: none"> <li>- Must have stainless steel platform</li> <li>- Must have clamping device.</li> <li>- Speed (Approximately) 1800 RPM</li> <li>- Must have stainless steel housing</li> <li>- Approximate overall size 18" L x 8" H x 14"</li> </ul>
	8	Mixer for test tube	2	<ul style="list-style-type: none"> <li>- It must have rheostate control for variable speed</li> <li>- Overall approximate size 5" square x 4 ½ H</li> </ul>
	9	Micromixer (for sedimentation)	2	<ul style="list-style-type: none"> <li>- Must have automatic start and stopswitch and motor and rubber feet</li> </ul>
	10	Dessicator	1	<ul style="list-style-type: none"> <li>- It should be air tight and be able to hold vacuum to 25" HG.</li> <li>- Approximate dimension 600 x 400 x 300 mm</li> <li>- It should have adjustable shelves with hole</li> </ul>
	11	Stirrer (Dual shaft)	2	<ul style="list-style-type: none"> <li>- Number of jaws: 3</li> <li>- Size of jaw (approximate) 3/8"</li> <li>- Rod dia (approximate) 8" x ½"</li> <li>- Approximate motor measurement 7 ½" x 3 ½" x 3 3/4"</li> </ul>
	12	Muffle Furnace	1	<ul style="list-style-type: none"> <li>- Temp range: + 66 -1000°C</li> <li>- Built in thermocouple pyrometer with dual scale range</li> <li>- Approximate interior dimensions 30" x 17" x 8"</li> <li>- Furnace should be insulated</li> </ul>

CHEMISTRY LABORATORY

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
1,2,3	13	Portable light weight hood	1	<p>on all sides.</p> <ul style="list-style-type: none"> <li>- Overall size 37" x 25" x 29" H</li> <li>- Must have built in blower exhaust</li> <li>- Be heat resistant</li> <li>- Must have front safety shield</li> </ul>
	14	Magnetic stirrer with hot plate	3	<ul style="list-style-type: none"> <li>- Tempt range 30°C to 100°C</li> <li>- Stirrer speed: 60 - 1000 RPM</li> <li>- Thermostatic control</li> <li>- With two teflon coated stirring bar</li> </ul>
	15	Hot air oven	1	<ul style="list-style-type: none"> <li>- Working chamber (approximate) 42" x 35" x 29"</li> <li>- Induction motor driven blower</li> <li>- 3 perforated stainless steel split shelves</li> <li>- Blower capacity 60 cu ft/min</li> </ul>
	16	Analytical Balance	1	<ul style="list-style-type: none"> <li>- Weighing range: 300 gms</li> <li>- Digital readout</li> <li>- Has overload stop</li> </ul>
	17	Beam Balance	1	<ul style="list-style-type: none"> <li>- Weighing range: 1000 gms</li> <li>- Sensitivity: 0.1 gm</li> </ul>
	18	Colorimeter-Turbidimeter	1	<ul style="list-style-type: none"> <li>- To perform test of colorimeter and turbidimeter for pharmaceutical products.</li> <li>- The burette should be motor driven and electronically controlled</li> <li>- It should have result printer</li> </ul>

CHEMISTRY LABORATORY

Aplic Alternative	No.	NAME	QUANTITY REQUIRED	REMARKS	
1,2,3	19	Bench top centrifuge	2	<ul style="list-style-type: none"> <li>- Speed 1500 x 10,000 RPM</li> <li>- Rotor capacity (Maximum) 400 ml</li> <li>- Number of tubes: 8 x 50 ml</li> <li>- Tempt range: - 20°C - 40°C</li> <li>- Timer: 0 to 99 minutes</li> </ul>	
	20	Microscope	1	<ul style="list-style-type: none"> <li>- Sterotype</li> <li>- Power 10 x 30 x</li> <li>- Must have 360° rotatable head</li> </ul>	
	21	Heating mantle	1	250	<ul style="list-style-type: none"> <li>- Must have built in temperature control.</li> <li>- Must be rigid on outside, resilient on the inside.</li> <li>- For flask size in ml</li> </ul>
			1	500	
			1	1000	
			1	2000	
	22	Water Bath with Thermostat	2	<ul style="list-style-type: none"> <li>- Tempt: 0° to 100°C</li> <li>- Control accuracy: <math>\pm 0.05^\circ\text{C}</math></li> <li>- Capacity: 16 litres</li> <li>- Bath size in inches: 17.6 L x 9.7 W</li> </ul>	
	23	Microscope - illuminated	1	<ul style="list-style-type: none"> <li>- Objectives 4x, 10x, 543x, 100x</li> <li>- Must have 360 rotatable head</li> <li>- Must have ball bearing quadruple nose piece</li> </ul>	
24	Karl Fisher Apparatus	1			
25	Oven		With vacuum Temp (maximum) 250°C		

CHEMISTRY LABORATORY

Aplic Alter- native	Nº.	NAME	QUANTITY REQUIRED	REMARKS
1,2,3				Capacity 50 Litres
	26	Refractometer	1	Range: 1300 to 1700 nD
	27	Refrigerator	1	Standard Laboratory size
	28	Millipore Filter Unit	1	- Of Stainless steel Sealing Silicone Ring, 280 x 4 mm - Prefilter Dia 279 mm
	29	Vacuum Pump	2	Standard Laboratory size
	30	Apparatus for desinte- gration Test of Capsules	1	
	31	Apparatus to check disolution of capsules	1	
	32	Fluorescence Spectropho- tometer	1	Perkin-Elmer LS-5
	33	Paper Electrophoresis	1	DESAGA type
	34	Gel Electrophoresis	1	DESAGA type
	35	Paper Chromatography Jars	6	DESAGA type
	36	Thin Layer chromatograph Jars	6	DESAGA type
	37	Boiling Point Apparatus	1	ASTEM-test apparatus
	38	Conductimeter	1	Range: 1.30 to 1300 N S/cm
	39	Freezer	1	
	40	Hardness Test Apparatus	1	
	41	Ball Mill	1	
	42	Sieves Set	1	

CHEMISTRY LABORATORY

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
	43	Microbalance	1	Mettler-M-3
	44	Centrifuge (High Speed Refrigerated)	1	Heraeus-Varifuge K
	45	Liquid - Liquid Extractor	1	Standard Laboratory size
	46	Solid - Liquid Extractor	1	Standard Laboratory size
	47	Rota - Vap Distillation Apparatus	2	Standard Laboratory size
	48	Flash Evaporator	1	Standard Laboratory size
	49	Acid - Basic Titration Apparatus	1	Digital titration type
	50	Elemental Analysis set up	1	Perking-Elmer 240 C
	51	Fractional Distillation Apparatus	1	Standard Laboratory
	52	Fraction Collector	2	
	53	Peristaltic pump	2	
	54	Electrofocusing equipment		
	55	Lyphlizer	1	
	56	Infrared lamp	1	
	57	UV lamp	1	
	58	Desk calculator	1	



B. INSTRUMENT ROOM APPARATUS

Aplic Alternative	No.	NAME	QUANTITY REQUIRED	REMARKS
1,2,3	1	Atomic Absorption spectrophotometer	2	Perkin-Elmer-2380
	2	Infrared spectrophotometer	2	Perkin-Elmer-1300
	3	UV/VIS spectrophotometer	2	Perkin-Elmer-5515
	4	Gas chromatograph	2	Perkin-Elmer-Sigma 500
	5	High liquid pressure chromatograph	1	
	6	NMR (nuclear magnetic resonance)	1	
	7	Mass spectrograph	1	

C. MICROBIOLOGY LABORATORY

Aplic Alternative	No.	NAME	QUANTITY REQUIRED	REMARKS
1,2,3	1	Colony counter	1	
	2	Colorimeter - Turbidimeter	1	
	3	Centrifuge	2	
	4	Pyrogen testing room	1	- Controlled system (tempt + humidity 20°C)
	5	Autoclave	1	- Internal chamber size 20" x 38" - Steam system - With trays & shelves
	6	Fridge	1	Standard laboratory size
	7	Laminar flow unit	1	Size 700 mm x 600 mm
	8	Tables	4	Special type for plates
	9	Receiving pots	1	- Stainless steel - Size 5 L - Size 10 L
	10	Filtration Unit	1	- Millipore, laboratory size
	11	Vacuum pump	1	Standard laboratory size
	12	Water bath with thermostat	2	- Capacity 16 litres - 22" L x 11" W x 7" H - - Constant temperature - Between 0°C and 100°C - control accuracy pump
	13	Metal trays	8	- Size 30 x 40 8 cm Sterilization purpose
	14	Oscillating shaker	3	- For tubes - 47 RPM stainless steel plat-

MICROBIOLOGY LABORATORY

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
1,2,3				form clamping device platform size 11" W x 5½" L
	15	Multi magnet mix	3	- Single drive - Six position magnetic stirrer, adjustable speed 5-200 RPM, size 48" L x 12" W x 4½" H
	16	Stirrer	3	
	17	Cold Plates	2	- Solid state, thermoelectric cold plate, cool to - 160°C heat to 85°C (+ 185°F) built in magnet stirrer.
	18	Thermometer with extension	4	- Body temperature probe
	19	Incubator	1	Laboratory size, tempt range 30-62°C Dimensions W X H X D in mm 395 x 280 x 288
	20	PH meter	1	
	21	Automatic dosifying unit for plates	1	
	22	Microscope	1	Objectives 4X, 10X, 543X, 100X
	23	Bacteriological glove box	1	
	24	Microscope	1	Dual power 10 x, 30 x
	25	Particle testing unit	1	
	26	Analytical balance	1	Capacity 500 gms
27	Beam balance	1	Capacity 1 kg	

MICROBIOLOGY LABORATORY

Aplic Alter- native	Nº.	NAME	QUANTITY REQUIRED	REMARKS
1,2,3	28	Shaker platform type	1	
	29	Water bath	2	
	30	Deep frost refrigerator	1	
	31	Surgical instrument set	1	

## D. PHARMACOLOGY LAB + ANIMAL BREEDING FACILITY

Aplic Alternative	No.	NAME	QUANTITY REQUIRED	REMARKS
1,2,3	1	Hewlett-Packard, 4 - Channel Recorder	1	
	2	Hewlett-Packard, 8 - Channel Recorder	1	
	3	Carrier Amplifiers (Hewlett-Packard)	7	
	4	Kymograph, Electrical	3	
	5	Cryostat Microtome	2	
	6	Colorimeter	1	
	7	Electronic Stimulator	1	
	8	Respirator	1	
	9	Serum Protein Meter	1	
	10	Oscilloscope (4 Channel)	1	
	11	Pressure Transducers (Hewlett-Packard)	4	
	12	ECG Amplifiers (Hewlett-Packard)	2	
	13	Infusion Pump	1	
	14	Drop Selector	1	
	15	Freeze drying apparatus	1	
	16	Animal tables	2	
	17	Electroconvulsive Apparatus	1	
	18	Refrigerated Centrifuge	2	

PHARMACOLOGY LAB + ANIMAL BREEDING FACILITY

Aplic Alternative	No.	NAME	QUANTITY REQUIRED	REMARKS
1,2,3	19	Dryings Ovens	1	
	20	Oven (Precision)	1	
	21	Incubator	1	
	22	Ph Meter	1	
	23	Binocular microscope	1	
	24	Tissue Homogenizer	1	
	25	Mettler Balance	2	
	26	Metabolism Units	8	
	27	Top-loading animal Balance	1	
	28	Torsion Balance	1	
	29	Refrigerator	1	
	30	Freezer	1	
	31	Jiggle Platform	1	
	32	Drug storage cabinet	1	
	33	Bearn Balance	1	
	34	Stimulator boxes	1	
	35	Miscellaneous equipment and instruments	Various	
36	Egg Amplifiers	2		
37	Rabbits	85	Male 8 Female 77	

PHARMACOLOGY LAB + ANIMAL BREEDING FACILITY

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
1,2,3	38	Mice	1000	Male 125
	39	Shelves with 311 cages of Mice, each equipped with drinking system	30	-----
	40	Shelves with 30 cages of Rabbits each equipped with drinking system	3	-----
	41	Crematory Furnace	1	
	42	Thermometer	2	Body probe type
	43	Tables	3	- Stainless steel - 2 x 1 meter
	44	Water bath	2	
	45	Balance/Rabbits	1	Capacity 5 kg <sup>3</sup>
	46	Balance Mice	1	Capacity 1 kg
	47	Fridge	1	Standard laboratory size
	48	Bottle washer	1	
	49	Cage washer	1	
	50	Animal carts	4	
	51	Animal Quarantine zone	1	
	52	Surgical Instrument set	2	

E. PILOT PLANTS

o Synthetic Drugs  
o Medicinal Plant Drugs

Aplic Alternative	No.	NAME	QUANTITY REQUIRED	REMARKS
1	1	Reactor	1	500 l, Glass Lined, Jacketed, variable speed agitator type, reflux columns condenser /receiver.
	2	Reactor	1	200 l, Glass Lined, Jacketed, variable speed agitator anchor with reflux column, condenser /receiver
	3	Reactor	1	500 l, S.S. 316 L, Jacketed, variable speed agitator
	4	Reactor	1	200 l, S.S. 316 L, Jacketed, variable speed agitator
	5	Preparation tank	1	500 l, S.S. 316 L, Jacketed, variable speed agitator
	6	Preparation tank	1	300 l, S.S. 316 L, Jacketed, variable speed agitator
	7	Preparation tank	1	300 l, Glass Lined, Jacketed, variable speed agitator
	8	Crystallization tank	1	500 l, Glass Lined, Jacketed, variable speed agitator
	9	Crystallization tank	1	300 l, S.S. 316 L, Jacketed, variable speed agitator
	10	Addition tank	1	500 l, S.S. 316 L, Jacketed, variable speed agitator
	11	Addition tank	2	200 l, S.S. 316 L, Jacketed, variable speed agitator



PILOT PLANTS

- o Synthetic Drugs
- o Medicinal Plant Drugs

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
1	12	Addition tank	2	100 l, S.S. 316 l., Jacketed, variable speed agitator
	13	Addition tank	1	100 l, Plastic
	14	Addition tank (portable)	4	50 l, Plastic

PILOT PLANTS

(Synthetic &amp; Medicinal Plant Drugs)

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS	
1	15	Washing tank	2	50 l, S.S. 136 L, Jacketed, with agitator	
	16	Addition tank	2	100 l, S.S. 316 l., Jacketed, variable speed agitator	
	17	Addition tank		100 l, Plastic	
	18	Basket Centrifuge	1	600 mm. S.S. (with pump and receiver)	
	19	Basket Centrique	1	600 mm. Rubber Lined, (with pump and receiver)	
	20	Nutsch Filter	2	600 mm. Ceramic or Glass Lined.	
	21	Fluid Bed Dryer	1	Aeromatic-3	
	22	Vacuum Rotary Dryer			
	23	Static Vacuum Dryer			
	24	Mill	1		
	25	Blender	1	"V" type	
	1,2	26	Sieve	2	
		27	Scale (Raw material)	1	200 kg
		28	Scale (Finish product)	1	100 kg
		29	Hammer mill	1	60
30		Percolator	3	500 l, S.S.	
31		Storage tank (solvent)	2	500 l, S.S.	

PILOT PLANTS

(Synthetic &amp; Medicinal Plant Drugs)

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
1,2	32	Intermediate tank	2	500 l, S.S.
	33	Concentrator (With condenser and receiver)	1	500 l
2	34	Dryer		
	35	Storage tank	2	300 l, S.S. Jacketed, with agitator
	36	Centrifugal extractor	2	
	37	Centrifugal mixer	2	
	38	Solvent tank (for extractors)	1	500 l, S.S. 316 L, Jacketed, with agitator
	39	Auxiliary tank	1	200 l, S.S. 316 L, Jacketed, with agitator
	40	Auxiliary tank	1	200 l, S.S. 316 L, Jacketed, with agitator
	41	Spent solution tank	1	500 l
	43	Vacuum, rotary filter	1	S.S. 316 L, 4m <sup>2</sup>
	44	Evaporator (with condenser/receiver)		500 l, S.S. 316 L
	45	Centrifugal pump	3	Capacity 50 LPM - 10 m
	46	Centrifugal pump	9	Capacity 20 LPM - 10 m
	47	Vacuum pump	4	Water ring type, up to 0.06 bar, 200 m <sup>3</sup> /h

PILOTS PLANTS

(Synthetic &amp; Medicinal Plant Drugs)

Aplic Alter- native	Nº.	NAME	QUANTITY REQUIRED	REMARKS
1,2	48	Centrifugal pump	6	Capacity: 50 LPM - 10 m
	49	Centrifugal pump	6	Capacity: 20 LPM - 10 m
	50	Vacuum pump	2	Water ring type - up to 0.06 bar, 200 m <sup>3</sup> /h
	51	Steam boiler plant	1	300 kg/h - 10 bar
	52	Water Treatment Plant	1	3.0 m <sup>3</sup> /h
	53	Brine Chilling Plant	1	
	54	Chilled water Plant	1	
	55	Cooling Tower	1	
	56	Air Compressor	1	15 cfm at 150 psi
	57	Liquid Nitrogen Tank	1	Capacity 4.000 l
	58	Spent Solvent interme- diate Tank	5	500 l, SS with agitator
	60	Fresh Solvent Storage Tank	5	1.000 l - SS 316 L
	61	Distillation Column	1	
	62	Distillation Column	1	
	63	Reboiler	1	
64	Reboiler	1		
65	Exchanger	1		

PILOT PLANTS

(Synthetic &amp; Medicinal Plant Drugs)

Aplic Alternative	No.	NAME	QUANTITY REQUIRED	REMARKS
1,2	66	Exchanger	1	Capacity 50 LPM - 10 m
	67	Centrifugal Pump	12	
	68	Molecular Sieve	1	
1	69	Absortion column	1	
	70	Evaporator	1	
	71	Autoclave	1	
	72	Press Filter	3	
	73	Ball Mill	1	
	74	Extraction Column	1	

## F. FORMULATION PILOT PLANT

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
5	1	Automatic filling machine for Vials with Rubber Stopper Unit.	1	200 Units/Min
	2	Automatic filling machine for bottles	1	100 Bottles/Min
	3	Automatic capping machine	1	100 Units/Min
	4	Automatic filling machine for viscous liquids	1	100 Units/Min
	5	Automatic labelling machine	1	100 Units/Min
	6	Autoclave		Internal chamber size - 35" x 70" - Steam system - With trays
	7	Receiving pots	1	Size 5 L (Stainless steel) Size 10 L (Stainless steel) Size 25 L (Stainless steel)
	8	Millipore filtration unit	1	- Of stainless steel
			1	- Sealing silicone ring, 280 x 4 mm
	9	Laminar flow unit	1	Size 900 mm x 800 mm
	10	Fridge	1	
	11	Tables	4	- Stainless steel - Size 2 x 1 mm
	12	Vacuum pump	1	
13	Apparatus to record			

FORMULATION PILOT PLANT

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
3		temperature and humidity	3	Recording device for humidity and temperature equipped with recorded switch for moving paper
	14	Dry heat sterilizer	1	
	15	Rubber stopper washing machine	1	
	16	Tank with stirrer	1	Stainless steel steam jacketed - 10 L - 25 L - 50 L - 100 L
	17	Tank with stirrer		Stainless steel - 10 L - 25 L - 50 L - 100 L
	18	Manual capping machine	1	
	19	Bottle Opener	1	
	20	Colloid mill	1	
	21	Conveyor Belts	3	6 meter long
	22	Sterile zone	1	6 x 5 m, class 100
	23	Packing zone	1	7 x 6 m, class 10,000
	24	Heat sealer	1	For plastic bags
	25	Balance	1	- Platform type - Capacity 50 K

FORMULATION PILOT PLANT

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
5	26	Balance	1	Two pan type - 100 G
	27	Balance	1	One pan type 400 gms
	28	Lyphilizer	1	Capacity 20 litres - The standard temperature indicator reads from -85°C to + 25°C and vacuum gauge 0-2000 microns. - Must have quick automatic defrost system
	29	Milling machine	1	
	30	Sieving and screening machine	1	
	31	Mixing granulator	1	
	32	Fluid Bed diffusion dryer	1	
	33	Tray dryer	1	For powders and coated tablets
	34	Powder mixing kneading machine	1	
	35	Fine grinding machine	1	
	36	Compression machine	1	Single stroke
	37	Film coating unit	1	
	38	Drum lifting and tilting machine	1	



FORMULATION PILOT PLANT

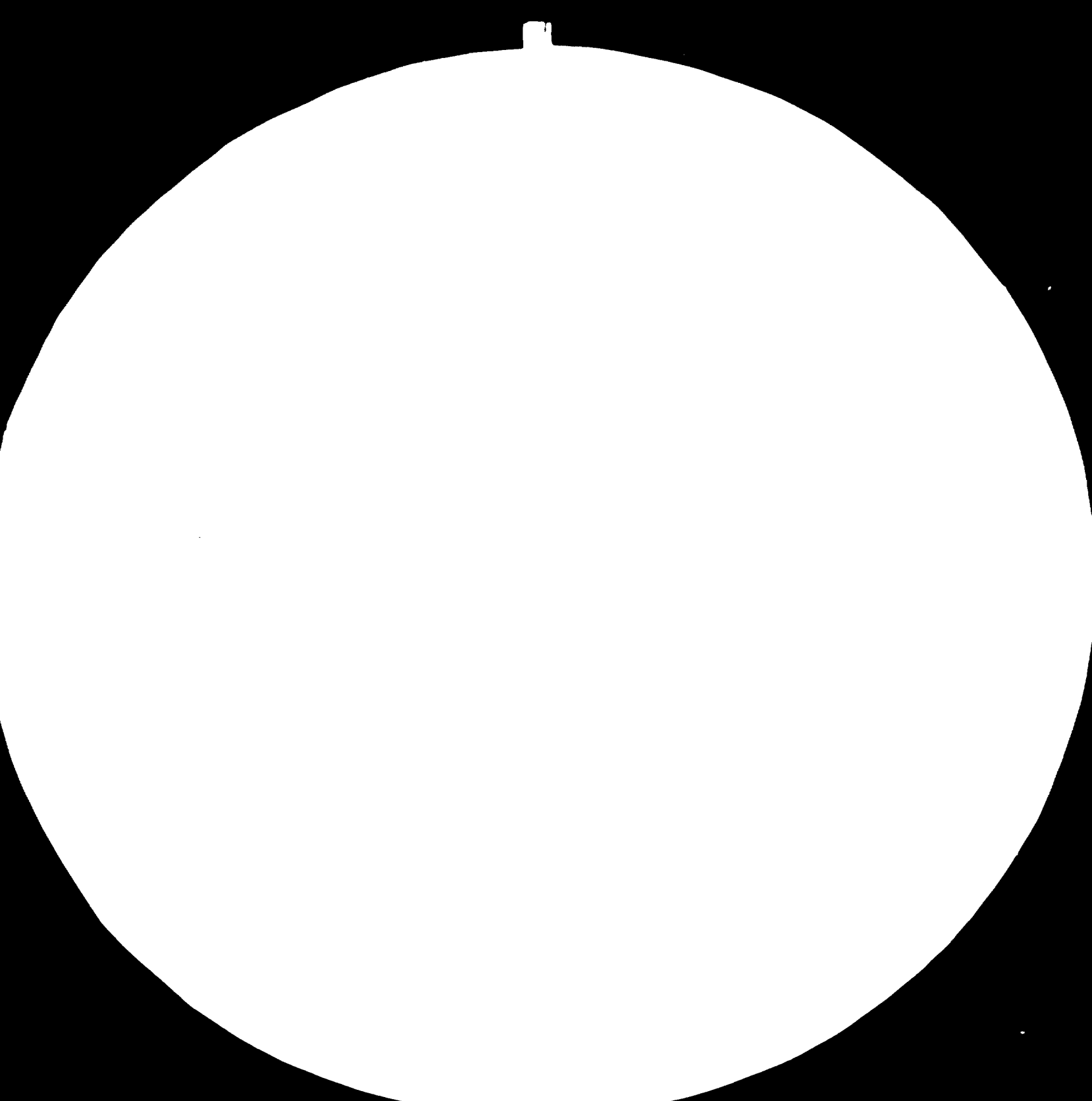
Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
3	39	Tablet counting and filling machine	1	
	40	Electronic balance	1	
	41	Capsule filling machine	1	100 capsule/minute
	42	Empty capsule loader	1	
	43	Filling area	1	for capsule class 1, 000-1000 meter!
	44	Capsule polishing unit	1	

G. SUPPORTING LABORATORIES FOR  
 Synthetic Pilot Plant +  
 Medicinal Pilot Plant +  
 Formulation Pilot Plant

Aplic Alternative	No.	NAME	QUANTITY REQUIRED	REMARKS
1	1	PH Meter	3 2forAlt1	PH measuring range: 0-14 Temp correction: Automatic Stability indication: Autoread
	2	Polarimeter	3 2forAlt1	Perkin-Elmer-241 MC
	3	Fluorescence Spectrophotometer	3	Perkin-Elmer-LS-5
	4	Paper Electrophoresis	3	
	5	Gel Electrophoresis	3	
	6	Thin Layer Chromatograph Jars	3	
	7	Liquid - Liquid Extractor	3 2forAlt1	
	8	Autoanalyzer	3 1forAlt1	All operations be selectable and automatically executable, such as sample aspiration, reagent additions, incubation times, incubation temperature, number of samples, wave length setting
	9	Densitometer	3 1forAlt1	It should be able to measure density of liquids and solids. Measuring range: 0-1.999 G/cm <sup>3</sup>
	10	Oscillation Shaker for	6 2forAlt1	- RPM 47 approximately - Must have stainless steel platform - Must have clamping device

G. SUPPORTING LABORATORIES

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
1	11	Mutimagnet mix	6	<ul style="list-style-type: none"> <li>- Speed (approximately) 1800 RPM</li> <li>- Must have stainless steel housing</li> <li>- Approximate overall size 18" L x 8" H x 14" W</li> </ul>
	12	Mixer for Test Tube	6	
	13	Mixer for Test Tube	6 2forAlt1	<ul style="list-style-type: none"> <li>- It must have rheostate control for variable speed</li> <li>- Overall approximate size 5" square x 4½ H</li> </ul>
	14	Micromixed (for sedimentation)	6 2forAlt1	<ul style="list-style-type: none"> <li>- Must have automatic start and stopwatch and motor and rubber feet</li> </ul>
	15	Muffle furnace	3 1forAlt1	<ul style="list-style-type: none"> <li>- Tempt range: <math>\pm 66 - 1000^{\circ}\text{C}</math></li> <li>- Built in thermocouple pyrometer with dual scale range</li> <li>- Approximate interior dimensions 30" x 17" x 8"</li> <li>- Furnace should be insulated on all sides</li> </ul>
	16	Meting Point Apparatus	3 1forAlt1	<p>It should be electrothermal type with thermometer range <math>20^{\circ}</math> to <math>360^{\circ}\text{C}</math> complete with 100 capillary tubes closed both ends 100 x 1.5 - 2.0 mm and with bottle or graphite</p>
	17	Viscosity thermostat bath	3 1forAlt1	<p>Be suitable for kinematic viscosity determination</p> <ul style="list-style-type: none"> <li>- Should have accurate electronic circuit</li> <li>- Should have over temperature cut out system</li> <li>- Tempt range: (approx. 670 x</li> </ul>





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS  
STANDARD REFERENCE MATERIAL 1010a  
(ANSI and ISO TEST CHART No. 2)

SUPPORTING LABORATORIES

Aplic Alter- native	No.	NAME	QUANTITY REQUIRED	REMARKS
1				320 x 610 mm) - Temperature control must be better than $\pm 0.01^{\circ}\text{C}$ throughout range - Should accompany all necessary accessories essential for viscosity
	18	Portable light weight hood	3 1 for Alt 1	- Overall size 37" x 25" x 29" H - Must have built in blower exhaust - Be heat resistant - Must have front safety shield
	19	Magnetic stirrer with hot plate	6 5 for Alt 1	- Temp range $30^{\circ}\text{C}$ to $100^{\circ}\text{C}$ - Stirrer speed: 60 - 1000 RPM - Thermostatic control - With two teflon coated stirring bar
	20	Hot air oven	3 1 for AS 1	- Working chamber (approximate) 42" x 35" x 29" - Induction motor driven blower - 3 perforated stainless steel split shelves - Blower capacity 60 cu ft/min
	21	Analytical balance	3 1 for Alt 1	- Weighing range: 300 gms - Digital readout - Has overload stop
	22	Balance	3 1 for Alt 1	- Weighing range: 1000 gms - Sensitivity: 0.1 gm
	23	Colorimeter-Tubimeter	3 1 for Alt 1	- To perform test of colorimeter and tubimeter for pharmaceutical products - The burette should be motor

SUPPORTING LABORATORIES

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
1				driven and electronically controlled - It should have result printer
	24	Centrifuge machine	6 2forAlt1	- Speed 1500 x 10,000 RPM - Rotor capacity (maximum) 400 ml - Number of tubes: 8 x 50 ml - Tempt range: -20°C -40°C - Timer: 0 to 99 minutes
	25	Microscope	3 1forAlt1	- Sterotype - Power 10 x 30 x - Must have 360° rotatable head
	26	Heating Mantle		- Must have buit in temperature control - Must be rigid on outside, resilient on the inside - For flask size in ml
			2	250
			2	500
			2	1000
			2	2000
	27	Water bath with thermostate	6 2forAlt1	- Tempt 0° to 100°C - Control accuracy: $\pm 0.05^\circ\text{C}$ - Capacity: 16 litres - Bath size in inches: 17.6 L x 9.7 W
	28	Microscope - illuminated	3 2forAlt1 1forAlt1	- Objectives 4 x, 10x, 543x, 100x - Must have 360 rotatable head - Must have ball bearing quadruple nose pice
	29	Oven	3 1forAlt1	- With vacuum - Temp. ( maximum) 250°C - Capacity 50 litres

SUPPORTING LABORATORIES

Aplic Alternative	Nº.	NAME	QUANTITY REQUIRED	REMARKS
1	30	Fridge	3 1forAlt	- Standard Laboratory size - Internal chamber size 20" x 38" - Steam system - With trays - With shelves
	31	Receiving pots	3 3	- Size 5 L (stainless steel) - Size 10 L (stainless steel)
	32	Millipore Filter Unit	3 2forAlt1	- Of stainless steel - Silicone sealing ring, 280 x 4 mm - Prefilter dia 279 mm
1,2,3	33	Vacuum Pump	3 1forAlt1	Standard laboratory size
	34	Apparatus to record humidity and temperature	3 2forAlt1	- Must have 24 hour chart - Recording device for humidity and temp, equipped with recorder switch for moving paper
	35	Apparatus for disintegration test of capsules	3 2forAlt1	
	36	Apparatus to check dissolution of capsules	3 2forAlt1	
	37	Sieve with vibrator	3 2forAlt1	Type PSS (VT-ERWEKA)
	38	Granulator (for wet material)	3 2forAlt1	Type FGS / ERWEKA
	39	Granulator (for dry material)	3 2forAlt1	Type TG25 ERWEKA
	40	MILL.	3 2forAlt1	Type KM5 ERWEKA
	41	MILL.	3 2forAlt1	Type 5M ERWEKA



SUPPORTING LABORATORIES

Aplic Alter- native	Nº.	NAME	QUANTITY REQUIRED	REMARKS
1,2,3	42	Mixer	3 2forAlt1	Type KB-15 ERWEKA
	43	Mixer	3 2forAlt1	Type SW-1 ERWEKA
	44	Mixer	3 2forAlt1	Type RS
	45	Tableting Machine	3 2forAlt1	Type EKO
	46	Tablet hardness Tester	3 2forAlt1	Type TBH 28 MID
	47	Film coating Unit	1	ERWEKA
	48	Polishing Unit	1	ERWEKA
	49	Container	1	VG Universal - ERWEKA
	50	Solid - Liquid Extractor	3 *	
	51	Rota-Vap distillation Apparatus	3 *	
	52	Flash evaporator	3 *	
	53	Acid-base titration Apparatus	3 *	
	54	Elemental analysis set up	3 *	Perkin-Elmer-240-C
	55	Fractional distillation Apparatus	3 *	
	56	Fraction collector	2	
	57	Electrofocusing	3 *	
	58	Infrared lamp	3 *	

(\*) = for each alternative.

SUPPORTING LABORATORIES

Aplic Alter- native	No.	NAME	QUANTITY REQUIRED	REMARKS
1,2,3	59	UV lamp	3	
1	60	Karl Fischer app.	1	
	61	Water distillator	1	
	62	Ball Mill	1	
	63	Liquid Nitrogen bottle	1	20 l.
	64	Reactors	2 2 2	Quickfit type or similar
	65	Electrical agitator	4	
	66	Absorption column	2	

III-4 LABORATORY CONSUMABLES

This list is provided for information and has been used to support the estimate of operating cost. No breakdown has been made for each Alternative, however the corresponding cost has been considered in the economical evaluation.

The amounts included herein are for one year operation.

The list has been prepared in response to point 4.e of the Terms of Reference.

LABORATORY CONSUMABLES

No	NAME	QUANTITY REQUIRED
1	Flask Volumetric Pyrex - Size 10 ml -     25 ml -     50 ml -    100 ml -    250 ml -    500 ml -    1 litre -    2 litres	500 500 500 500 500 300 200 250
2	Volumetric Flask coloured size 1 litres 50	
3	Flask Erlenmeyer, Pyrex - Size 100 ml -     150 ml -     250 ml -     500 ml -     1 litre	500 500 500 250 100
4	Flask Erlenmeyer, Ground neck - Size 100 ml -     250 ml	250 250
5	Flask, round bottom, Pyrex Size 1 litres 500 ml	200 200
6	Weighing crucibles - Size 2 ml -     5 ml -    10 ml	250 250 250
7	Pipet Caliberated, size 1 ml, one mark "     "     "    2 ml,     "	1000 1000

Consumable Laboratory Apparatus

No	NAME	QUANTITY REQUIRED
	Pipet Caliberated, size 3 ml, one mark	1000
	" " " 4 ml, "	1000
	" " " 5 ml, "	1000
	" " " 10 ml, "	1000
	" " " 25 ml, "	500
	" " " 50 ml, "	500
8	Pipet automatic, size 10 ml	15
	" " " 25 ml	15
9	Pipet Graduated, size 1 ml (Caliberated 1/50)	500
	" " 2 ml "	500
	" " 4 ml "	500
10	Pipet Graduated, size 1 ml Double mark (1/100 ml)	100
	" " 2 ml " (1/50 ml)	100
	" " 5 ml " (1/20 ml)	100
	" " 10 ml " (1/10 ml)	100
11	Glass Cylinders size 10 ml, Pyrex	250
	" " 25 ml, "	250
	" " 50 ml, "	250
	" " 100 ml, "	250
	" " 250 ml, "	250
	" " 500 ml, "	150
	" " 1 litre	100
	" " 2 litres	100
12	Beakers, low form Pyrex size 50 ml	200
	" " " 100 ml	200
	" " " 250 ml	200
	" " " 500 ml	200
	" " " 1 litre	100
	" " " 5 litres	50
13	Test Tubes, size 22 x 180 mm with mouth and cap serrated	2000
14	Test tube glass 18 x 180 mm	3000
15	Centrifuge tubes, size 10 ml Graduated	2000
	" " " With caps	2000
	" " " Without graduation	2000
16	Funnel Pyrex, Dia 4.5 cm	100
	" " 6 cm	100

Consumable Laboratory Apparatus

No	NAME	QUANTITY REQUIRED
	Funnel Pyrex, Dia 10 cm	100
	" " 16 cm	100
17	Buchner Filter Flask Size 250 ml	100
	" " 500 ml	100
	" " 1000 ml	100
18	Watch glass Dia 8 cm	50
	" " 10 cm	50
	" " 15 cm	50
19	Glass mortars Dia 70 ml	15
20	Microburettes, size 2 ml	25
	" " 5 ml	25
21	Capillary tube for melting point	
22	Membrane Filter size 0.45 micron	
	" " 0.22 micron	10 x 100
23	Disecting Tweezers (Tongs)	20
24	Plastic Gloves Disposable	14 x 1000
25	Containers - Stainless steel	15
	- Capacity 1 Litre	15
	- Capacity 2 litres	15
	- Capacity 5 litres	15
	- Capacity 10 litres	15
26	Scoops (Stainless steel)	
	Size in mm 50 x 100	
	Size in mm 75 x 100	
27	Teflon Coated Stirrer Bars	
	Size 2 1/2" x 1 1/2"	25
	Size 1 1/2" x 3/8"	50
	Size 5/8" x 5/16"	50
28	Stir Bar Retriever (14 3/4" Long Lead Encased in Teflon)	25
29	Separating Funnels Size in ml	
	- 25	50
	- 50	50
	- 250	50
	- 500	50

Consumable Laboratory Apparatus

No	NAME	QUANTITY REQUIRED	REMARKS
30	Trolley manual	4	Standard laboratory size
31	Clamps 3 prong accepts articles up to 70 mm dia	50	
32	Clamps 3 prong	50	Accepts articles up to 125 mm dia
33	Clamps 3 prong	50	Accepts articles up to 82 mm dia
34	Clamps for beakers asbestos covered jaws	50	Accepts articles up to 175 mm dia
35	Thermometer (mercury)	30	- 80°C + 40°C (immersion graduated 1°C, 12-15 cm)
		30	- 20°C + 11°C " "
		30	- 10°C + 250°C " "
		30	0°C + 100°C " "
		30	0°C + 250°C " "
		30	10°C + 100°C " "
36	Balance to weigh centrifuge tubes	3	Lever eccentric holder for tubes capacity 100 gms
37	Pipet holder	15	Wooden dia 17 cm, capacity 10-15 pipets
38	Pipet washer	5	Polyvinyl
39	Knife with handle	15	
40	Microscope accessories	1000	- Microscope slide (76 x 26 mm)
		1000	- Cover glass (22 x 22 mm)
41	Pipet	150	Size 1 ml
		150	Size 2 ml
		150	Size 4 ml
		150	Size 10 ml
		150	Size 25 ml
42	Stands (of metal)	50	Length 700 mm, Dia 12 mm
43	Extendable stands	50	Minimum length 55 mm, maximum length 240 mm, base 120 x 140 mm

Consumable Laboratory Apparatus

No	NAME	QUANTITY REQUIRED	REMARKS
44	Hipodermic Needle	1000 1000 1000	Disposable type Length 38 mm x 9/10 mm cross section Length 38 mm x 8/10 mm cross section Length 38 mm x 7/10 mm cross section
45		250 250 250	Stainless steel Length 20 mm x 6/10 mm cross section Length 20 mm x 5/10 mm cross section Length 20 mm x 15/10mm cross section
46	Surgical Gloves	100 x 20	
47	Glass syringe	100 100 100 100 100 100	Capacity 1 ml Capacity 2 ml Capacity 3 ml Capacity 5 ml Capacity 10 ml Capacity 20 ml
48	Spatulas (Stainless steel)	100 100	Length 15 cm Length 18 cm
49	Spatula (Stainless steel) with handle	100 100	Blade length 100 mm x width 16 mm Blade length 120 mm x width 17 mm
50	Spatula (double ends) flat stainless steel	100 100 100 100	Length 130 mm x width (ends) 9 mm Length 150 mm x width (ends) 5 mm Length 210 mm x width (ends) 9 mm Length 300 mm x width (ends) 20mm
51	Forceps (Stainless steel)	100 100 100 100 100	Length 11 cm straight points, point fin Length 14 cm straight points, point fin Length 15 curved points serrated Length 20 straight points blunt Length 25 straight points blunt
52	Spirit lamp (of glass)	10	
53	Tripode (with metal gauge)	50	15 x 15 cm dia 10 cm Adjustable height
54	Metal trays	50 50	Size 30 x 20 cms Size 40 x 30 cms

Consumable Laboratory Apparatus

No	NAME	QUANTITY REQUIRED	REMARKS
55	Scissor	20	Length 22.4 cm straight, blunt point
56	Metal Basket	20	For tubes dia 20 cm, stainless steel
57	Rubber Stopper	250 each	For flasks of 10 ml, 25 ml, 50 ml, 100 ml, 150 ml, 250 ml, 500 ml, 1 L, 2 L.
58	Hoffman Clips	200	
59	Mohar Clips	200	
60	Clamps	100	For Burettes dia 12-45 mm
61	Boss Heads	200	For Burettes dia 12-45 mm
62	Plastic Funnel	25	60 mm dia
		25	120 mm dia
63	Plastic Bottles		For washing purpose
		25	250 ml
		25	500 ml
64	Plastic Containers to check pH	100	Dia 50 mm. height. 60 mm
65	Cast iron rings	50	Closed type with boss head dia 140 mm
66	Caliphre	6	Stainless steel, lab size scale
67	Platinum wire	3 kg.	Dia 0.8 mm
68	Cork borer	10	With 12 calibrations
69	Petri Plates	4000	Plastic single use 10 cm dia
70	Pipet Tips	7 . 1000	
71	Plastic Bucket	15	Size 5 Litres
72	Test Tube Cleaning Burshes	25	
73	Burette	50	Size 2 ml with 250 ml Burette
		50	Size 5 ml with 500 ml Burette
		50	Size 10 ml with 500 ml Burette



Consumable Laboratory Apparatus

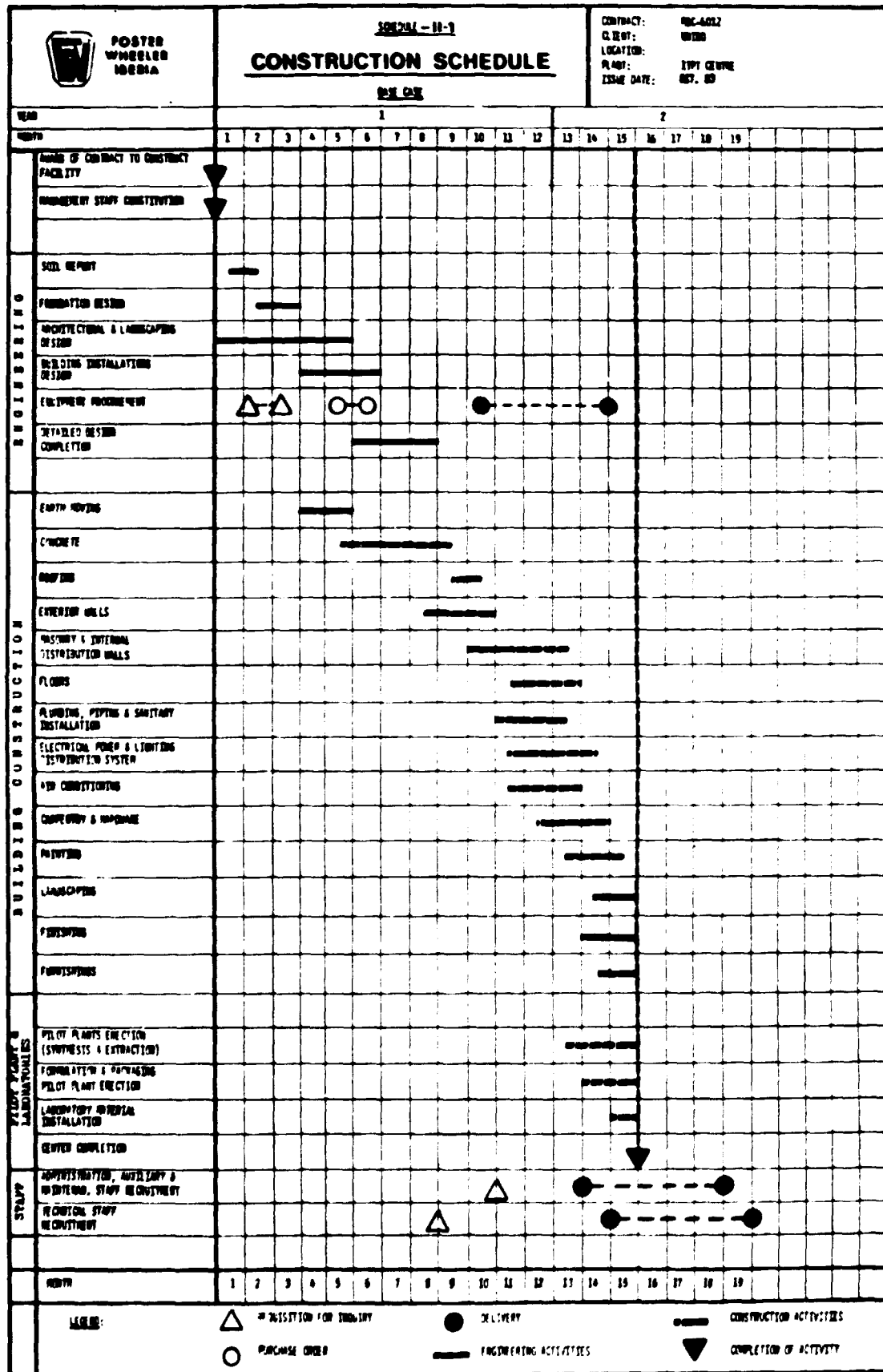
No	NAME	QUANTITY REQUIRED	REMARKS
74	Glass Funnel	50	Dia 6 cm
75	Plastic Funnel	50	Dia 12 cm
76	Dropping Bottles	50	Size 50 ml
77	Plastic Washing Bottles	25	Size 500 ml
78	Pyrex Bottles	100 100	Size 1 L Size 2 L
79	Coloured Glass Bottles	100	Size 1 L
80	Glass Bottles	500	Size 125 ml
81	Test Tube Stand	10 10 10 10 10 10	For 18 Tubes of 18 x 180 For 24 tubes of 18 x 180 For 36 tubes of 18 x 180 For 18 tubes of 18 x 120 For 24 tubes of 18 x 120 For 36 tubes of 18 x 120
82	Forceps Flat Ends	25	To handle filters
83	Aseptic Sterifil Unit	2	47 mm
84	Parafilm paper	20 Rolls	Size 4 inch x 125 ft
85	Aluminium foil	10 Rolls	Laboratory size
86	Calculator		10 With paper
87	Stop watch		18 Up to 160 minutes
88	Tong	50	For container dia 12 x 45 dia tw movable arms

**III-5 IMPLEMENTATION SCHEDULES**

Schedule II-1 "Construction Schedule" indicates the starting point, duration and sequence of the main activities that have to be performed for the construction of the I.T.P.T. Centre facilities. Although it has specifically been prepared for the Base Case, the activities and their duration will be similar for the three alternatives considered, specially for Alternate 3.

Schedule II-2 indicates the sequence of start up of the various activities and personnel recruitment periods. The whole schedule has been referred to the completion date of the Centre facilities. Negative figures indicate months in advance to facility completion date. The schedule has been prepared for the Base Case, however the planning of the various alternatives analyzed can be easily deducted from it.

Schedules are following:



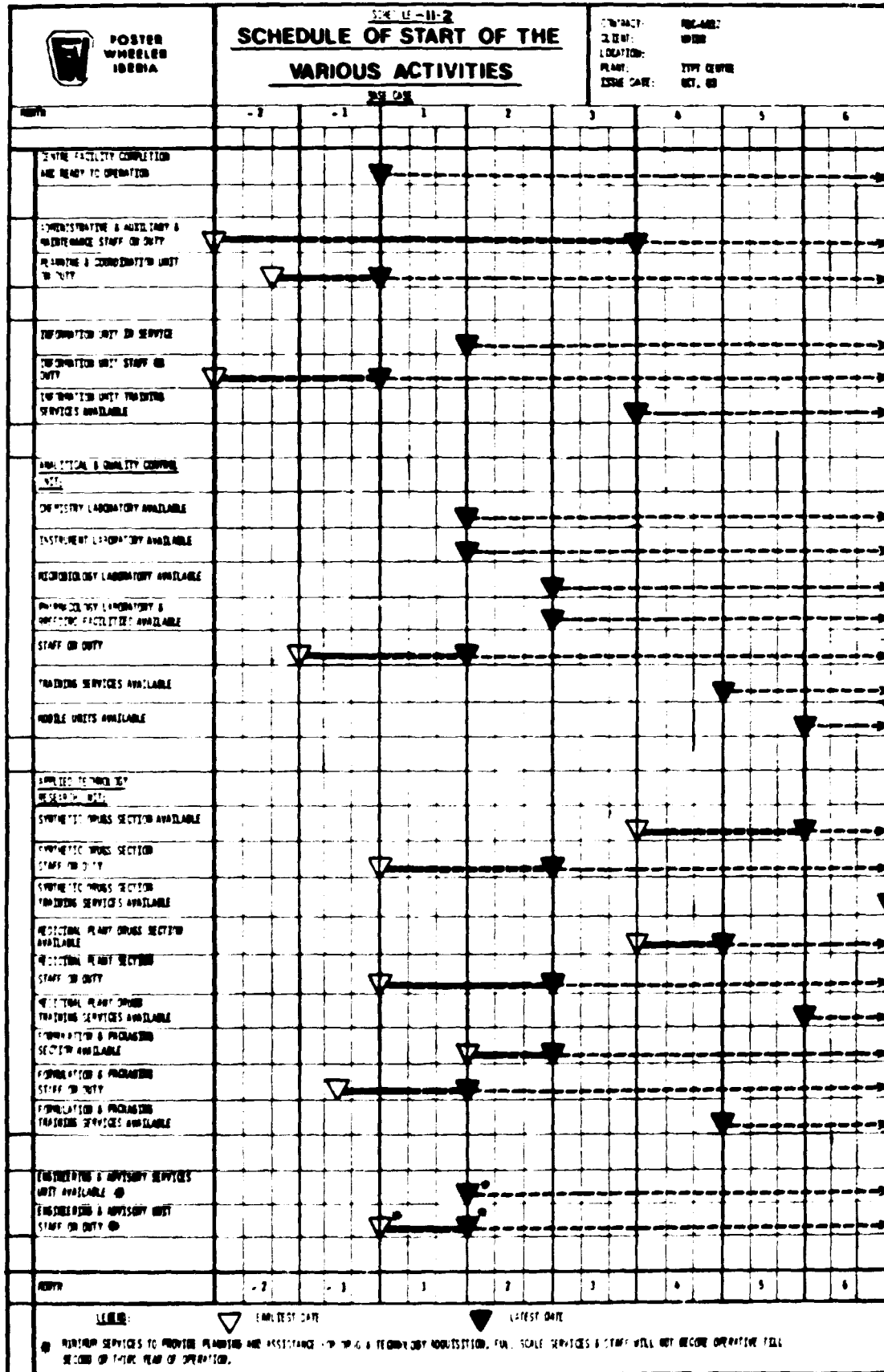


EXHIBIT II-1

QUESTIONNAIRE SENT TO DEVELOPING COUNTRIES



# FOSTER WHEELER IBERIA, S. A.

Ingenieros y Constructores

CALLE DE LA BASILICA, 17-MADRID-20

COMPANIAS ASOCIADAS EN:  
ARABIA SAUDITA - EKABIL  
CANADA - COLOMBIA  
EE. UU. DE AMERICA  
FRANCIA - INGLATERRA  
IRAN - ITALIA  
JAPON - KUWAIT  
MEXICO - TURQUIA

DIRECCION CABLEGRAFICA: REWOP - MADRID  
TELEFONOS 466 20 00 - 466 21 00  
TELEX 222 76 - 223 17

June 1, 1983

Gentlemen:

As you may already know, our company has been awarded a contract by the United Nations Industrial Development Organisation (UNIDO), to carry out a feasibility study for the establishment of an International Research and Development Center on Pharmaceuticals in Portugal in the interest of developing countries.

The background of this center is as follows:

In the course of the First Consultation on the Pharmaceutical industry held at Estoril, Portugal in December 1980, some delegations and groups of countries suggested that the UNIDO secretariat should consider the possibility of establishing an International Research and Development Center on Pharmaceuticals. It was envisaged that the center would undertake research and develop technology on behalf of governments and industry in developing countries, as well as conduct related activities such as quality control, training personnel and providing technical information.

At a follow-up meeting held in Mohammedia, Morocco on "Cooperation among Developing Countries" in December 1981, the UNIDO secretariat announced that the Portuguese Government was interested in establishing such a center and would soon discuss the project with UNIDO officials. It was suggested that the proposed Center should concentrate on process development for drugs produced by chemical synthesis and by extraction from medicinal plants. It was understood that a research center for producing drugs, in particular antibiotics, by fermentation processes would be established with UNIDO support at another location.

In January 1982 a UNIDO delegation visited Lisbon. Officials of the Portuguese Government confirmed the willingness of Portugal to host such a Center and to make available:

"An adequate scientific and technological environment and necessary space for its installation."

EXHIBIT II-2

DESCRIPTIVE DRAWINGS

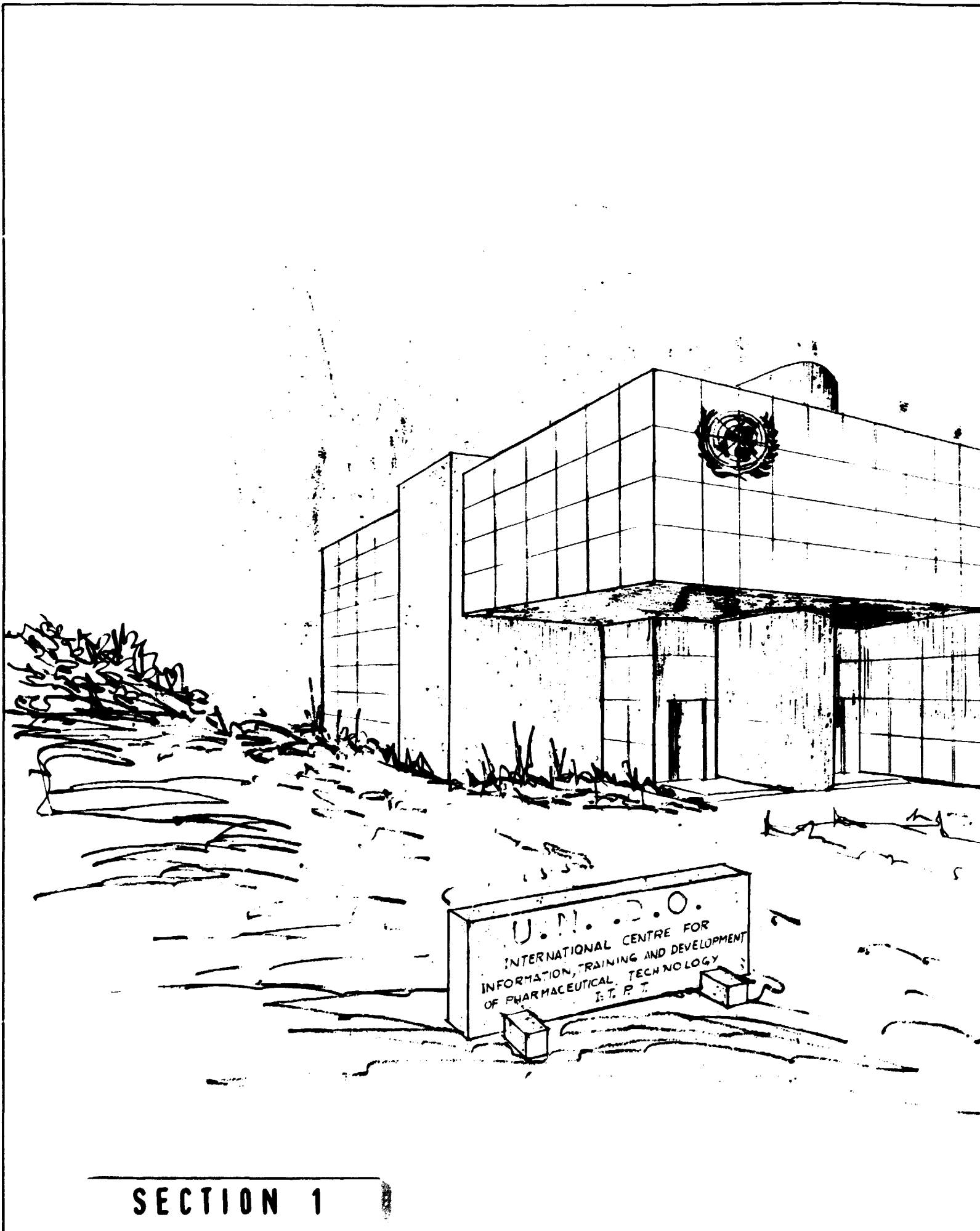
EXHIBIT II - 2

DESCRIPTIVE DRAWING INDEX

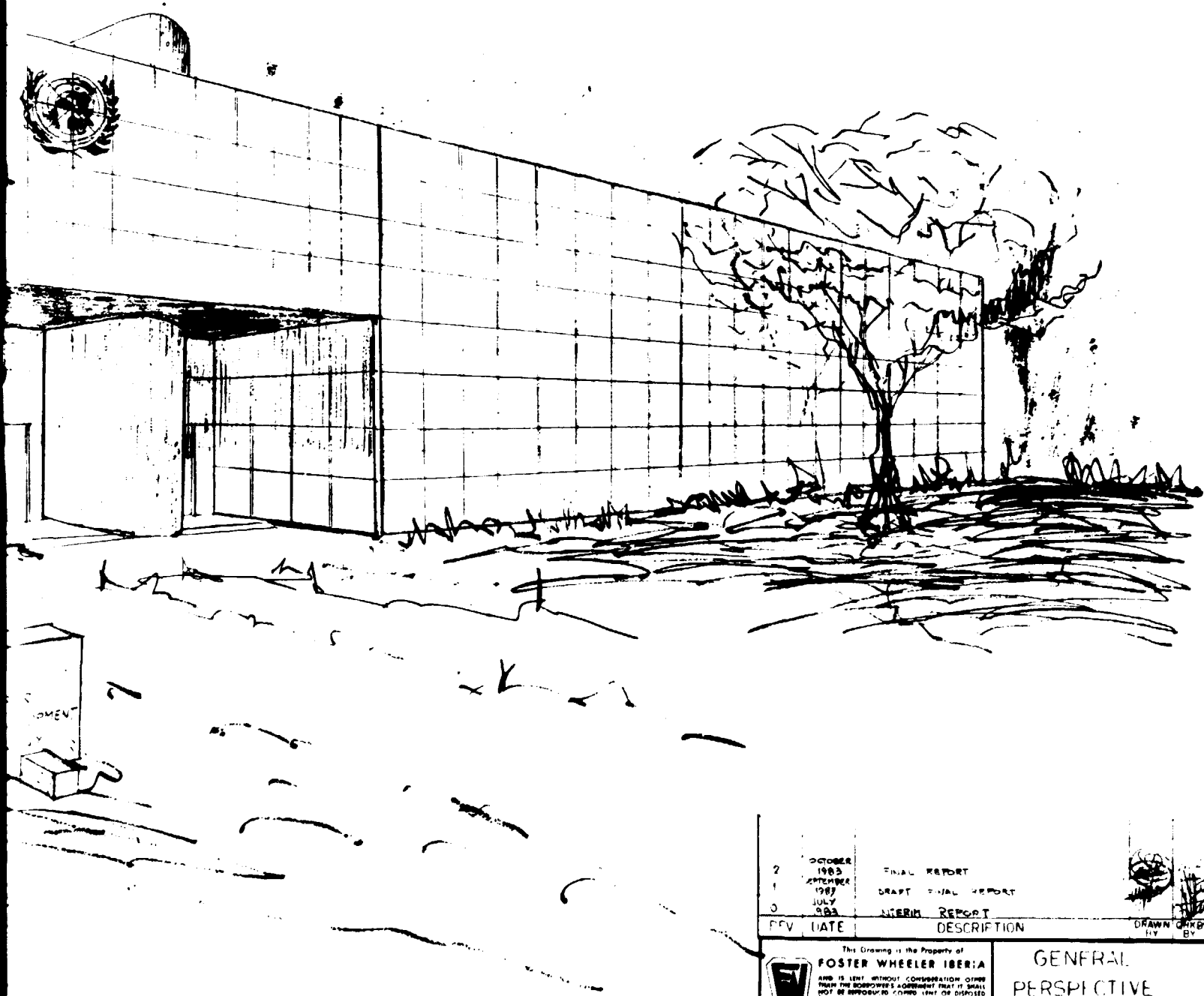
6012-AI-4701	General perspective
6012-AI-4702	Elevation
6012-AI-4703	Second Basement
6012-AI-4704	First Basement
6012-AI-4705	Ground Floor
6012-AI-4706	First Floor
6012-AI-4707	Second Floor
6012-AI-4708	Thrid Floor

Note: Drawings are attached to this Volume II in the rear cover holder.







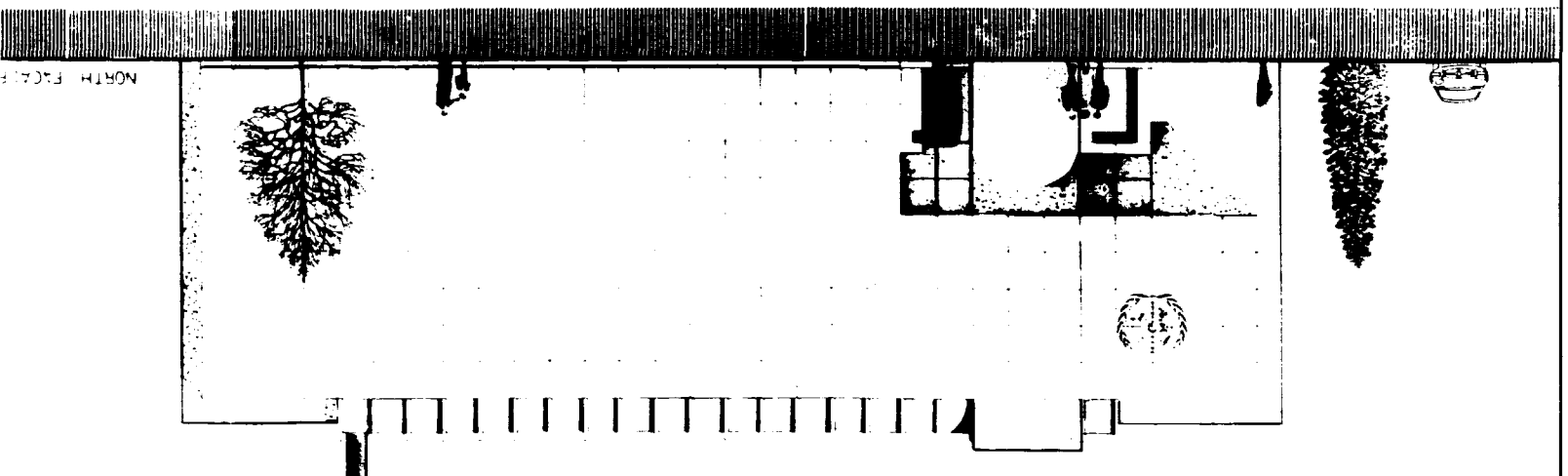
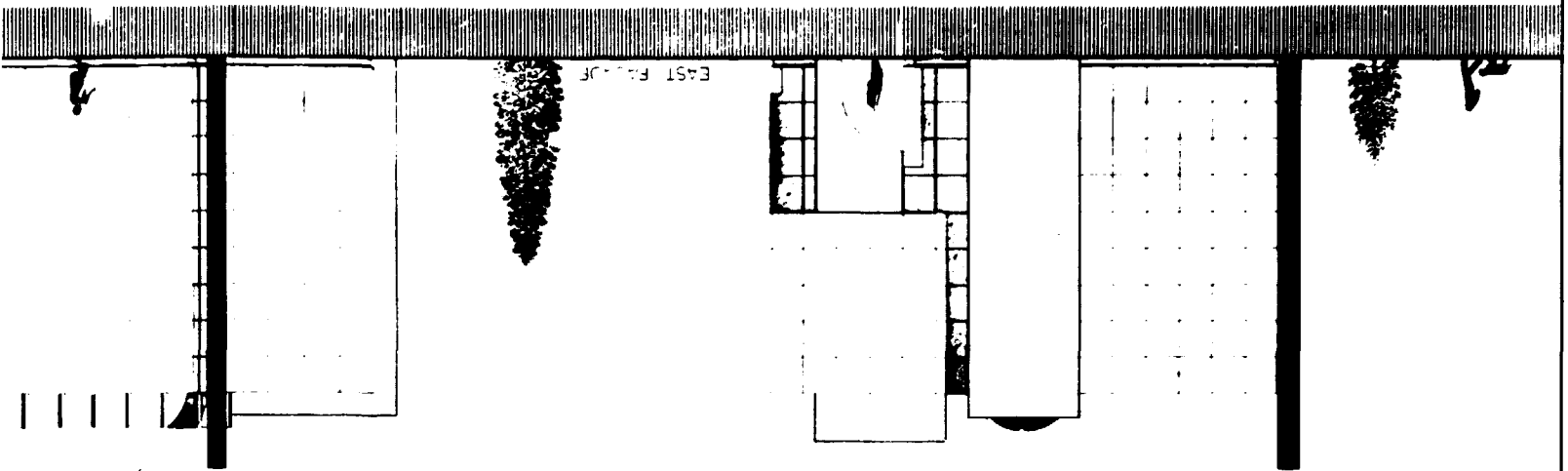
SECTION 1

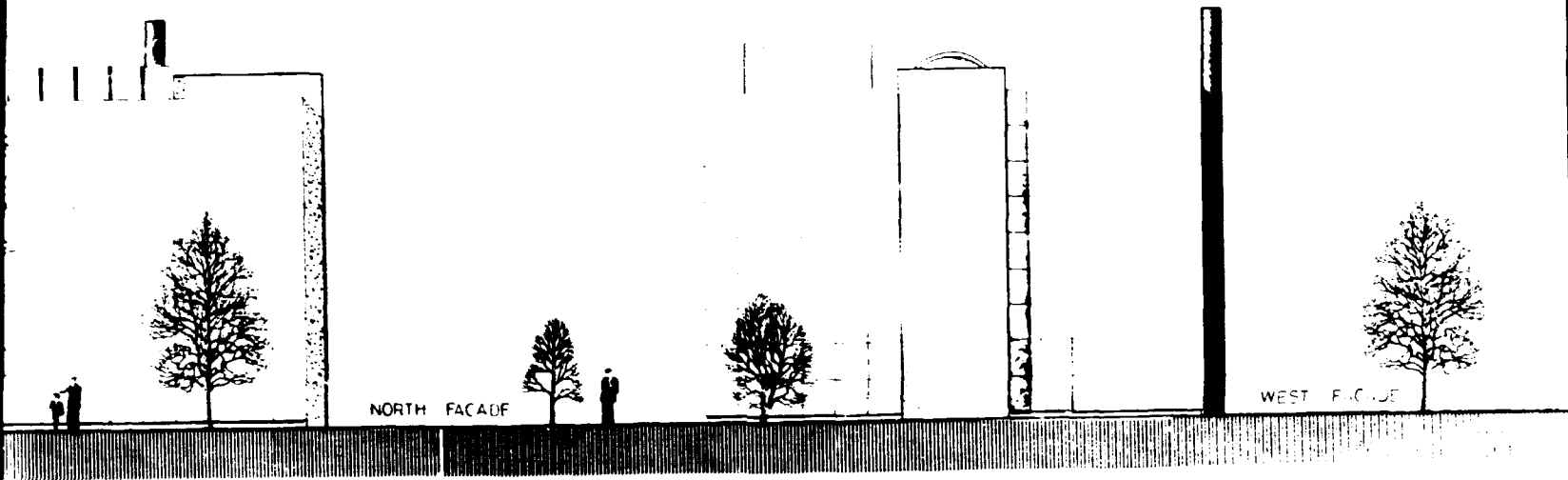


**SECTION 2**

2	OCTOBER 1983	FINAL REPORT	
1	SEPTEMBER 1982	DRAFT FINAL REPORT	
0	JULY 1982	INTERIM REPORT	
0			
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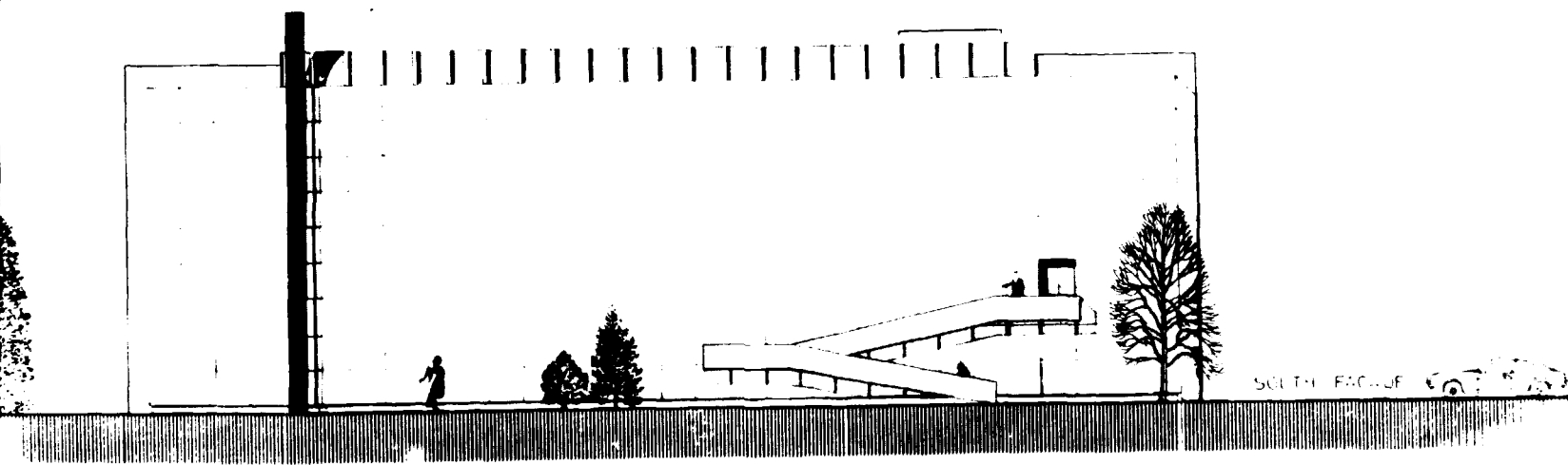
SECTION 1





NORTH FACADE


WEST FACADE



SOUTH FACADE

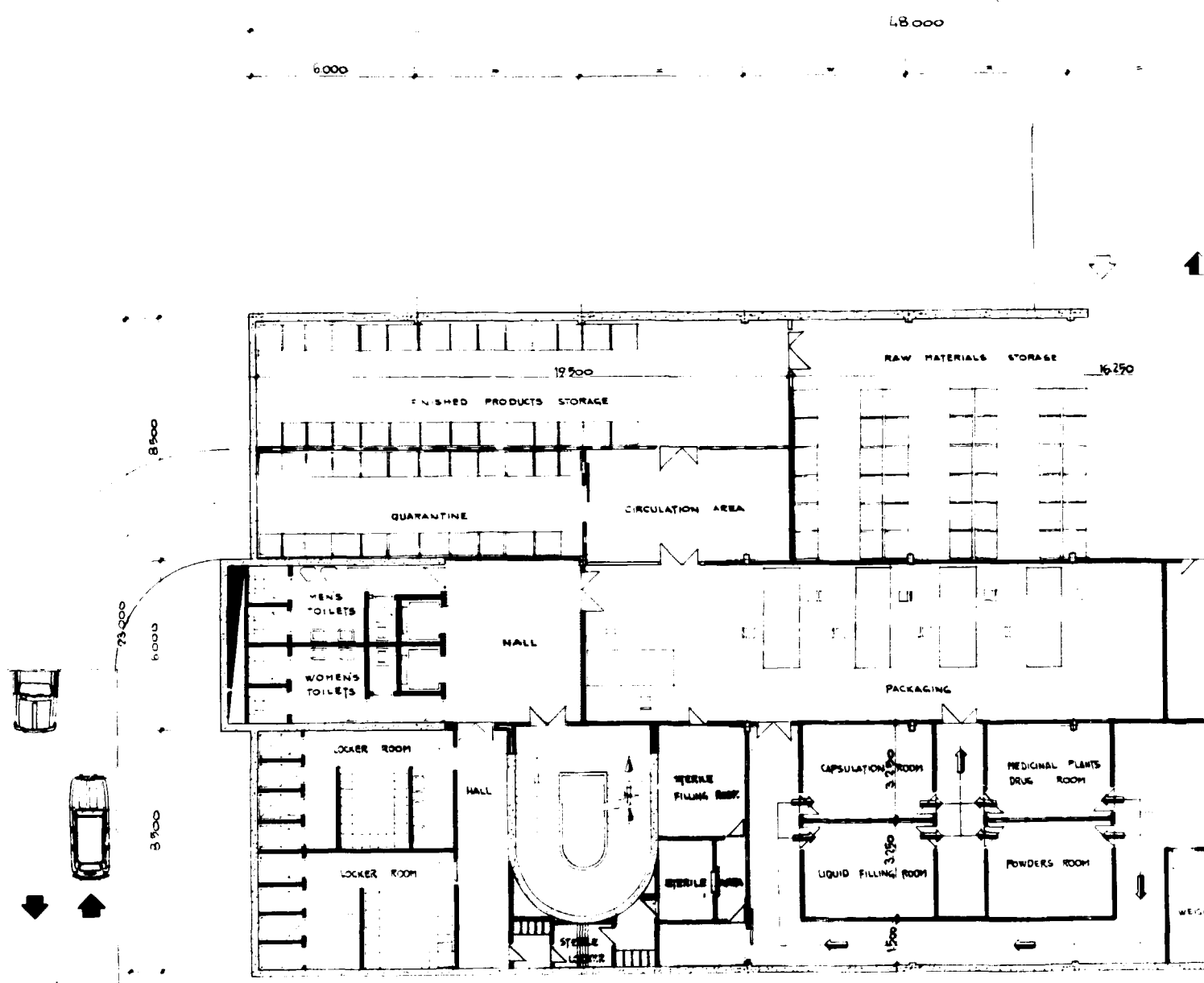
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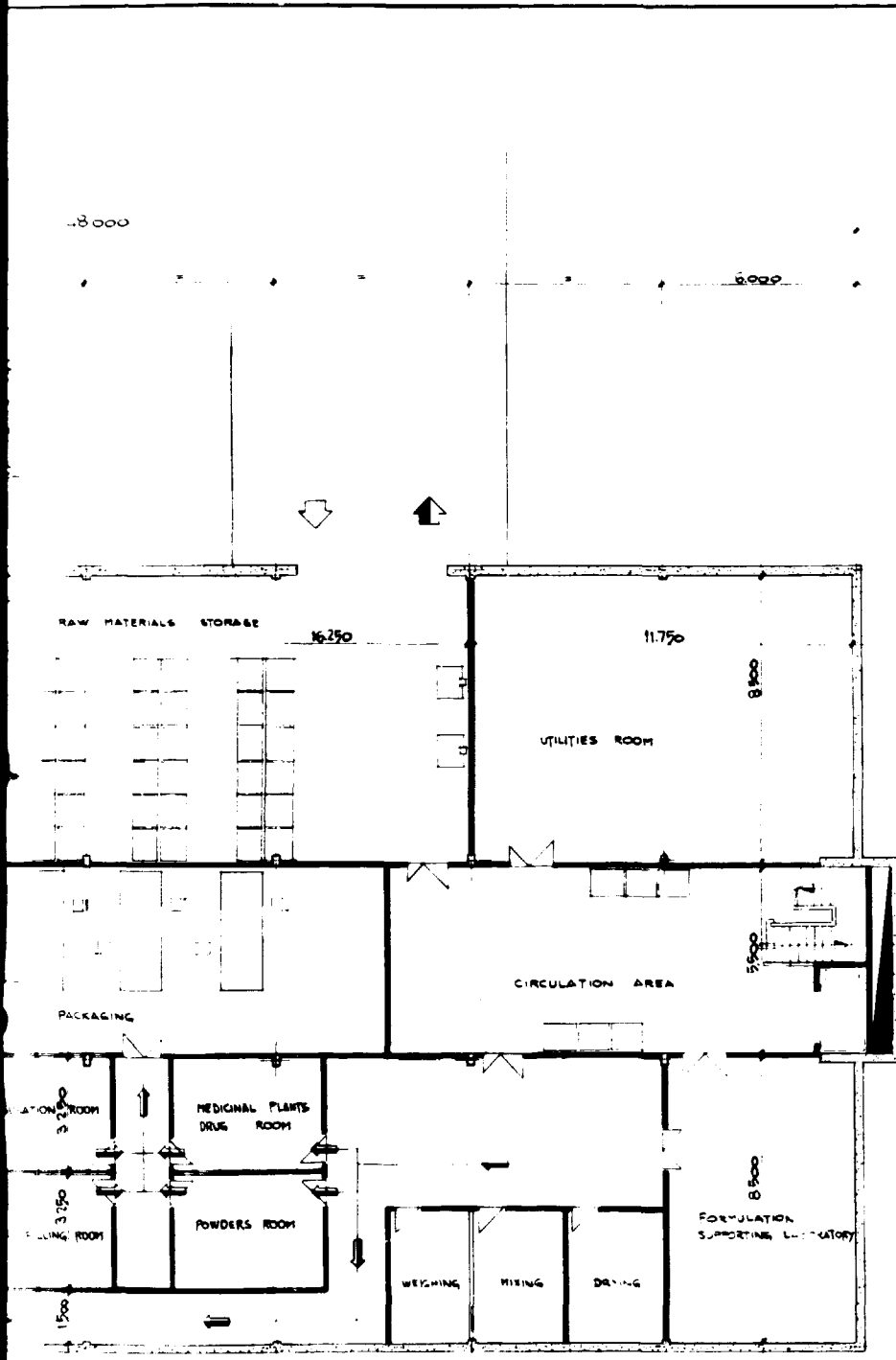
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FORMULATION & PACKAGING AREA

**SECTION 1**






DISTRIBUTION & PACKAGING AREA

# SECTION 2

## NOTES

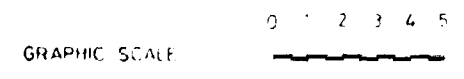
1. ALL DIMENSIONS ARE INDICATED IN MILLIMETERS AND THE ELEVATIONS IN METERS



### SYMBOLS

-  CAR ENTRANCE & EXIT
-  FINAL PRODUCTS EXIT
-  RAW MATERIALS ENTRANCE

## REFERENCE DRAWINGS

TITLE	DRAWINGS N°



REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
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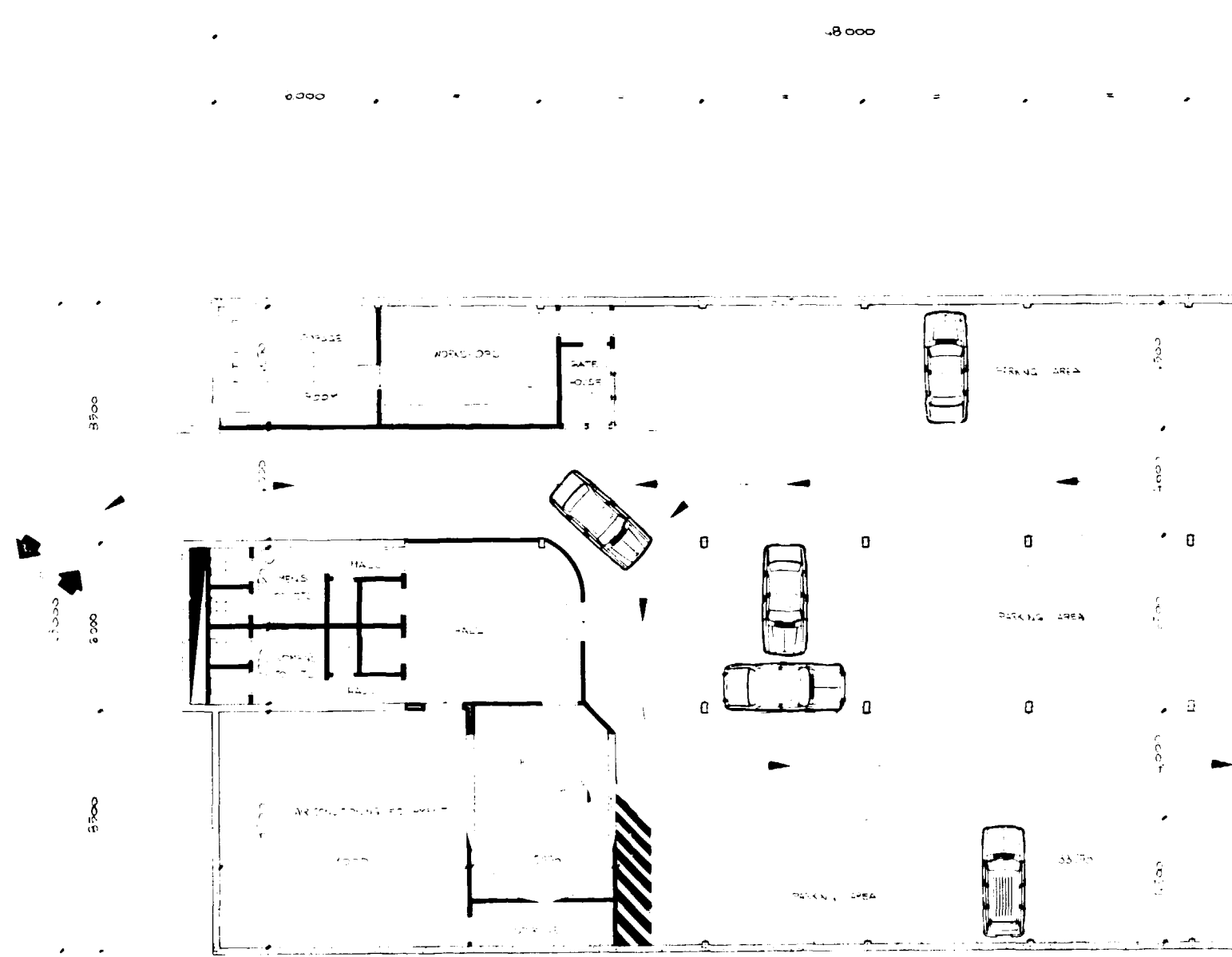
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DWG. N°: 6012-A1-47-03 SHEET OF 2 REV 2



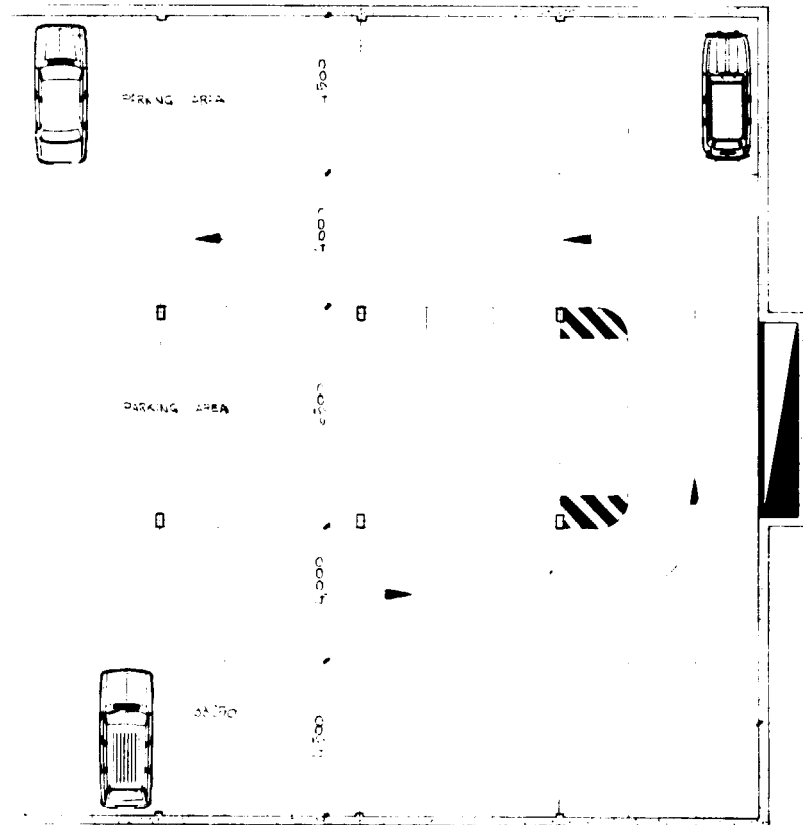
**SECTION 1**

NOTES

SYMBOLS

-  CAR ENTRANCE & EXIT
-  CAR CIRCULATION SENSE

ALL DIMENSIONS ARE INDICATED IN METERS AND THE ELEVATIONS IN METERS



REFERENCE DRAWING

TITLE

DRAWING Nº

GRAPHIC SCALE

0 1 2 3 4 5

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REV DATE DESCRIPTION

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**DISTRIBUTION & FURNISHINGS, BASEMENT SECOND**

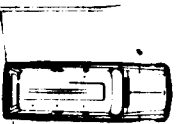
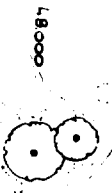
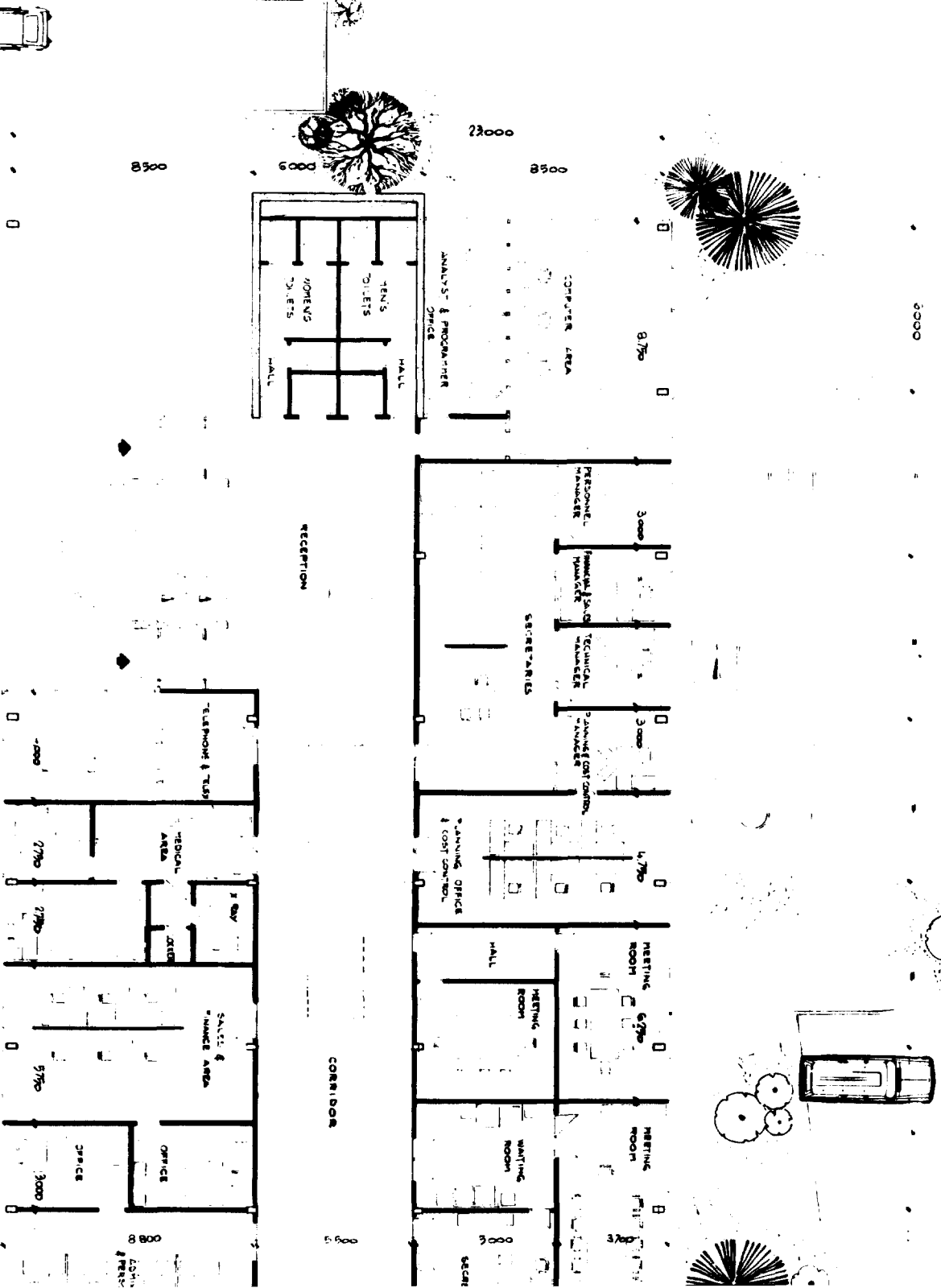
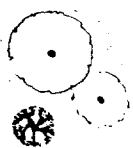
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DWG Nº: 6012-A1-47-04

SECTION 2



# SECTION 1

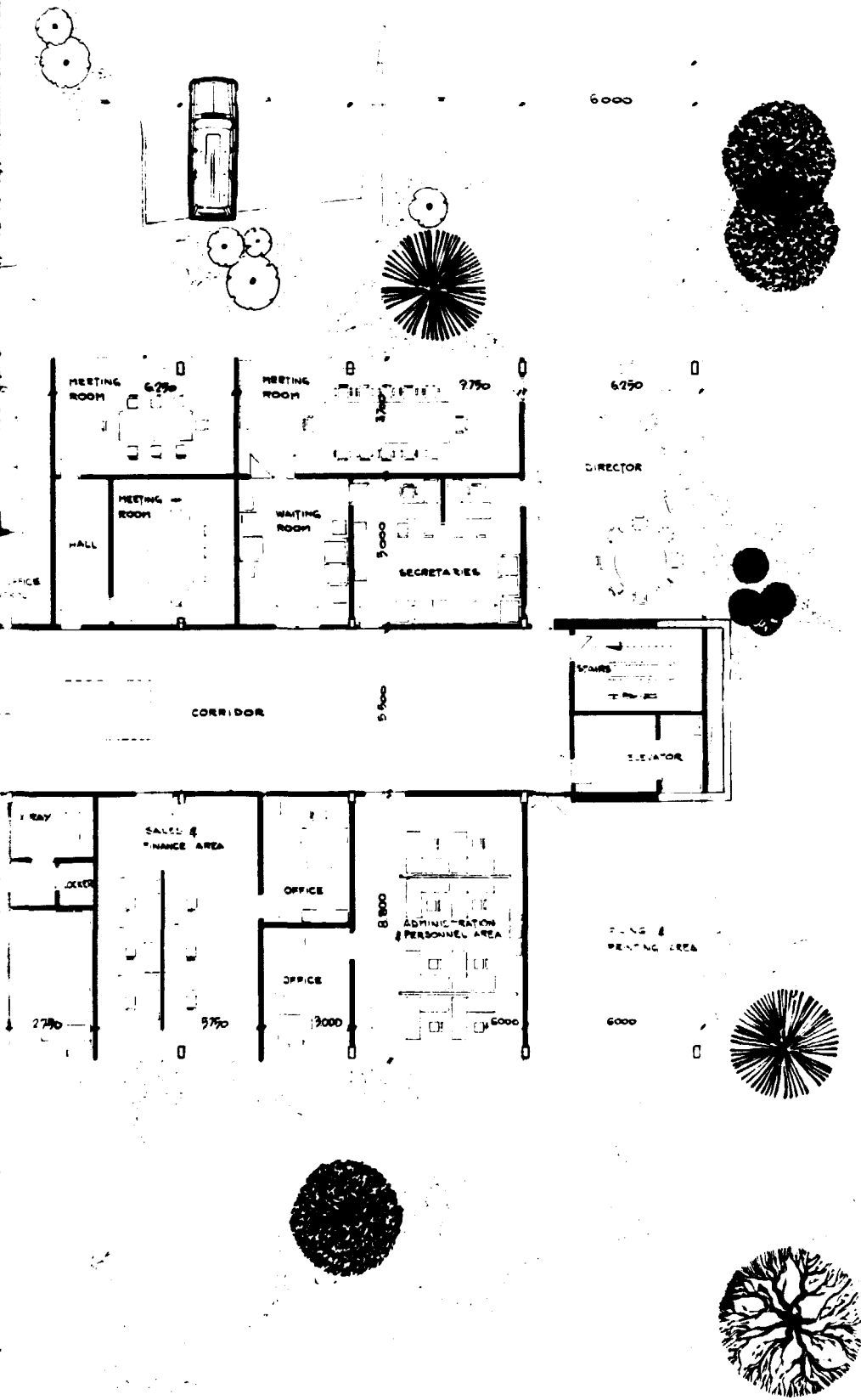


# NOTES

**SYMBOLS:**

◆ MAIN ENTRANCE

1. ALL DIMENSIONS ARE INDICATED IN MILLIMETERS AND THE ELEVATIONS IN METERS



## REFERENCE DRAWINGS


REV	DATE	DESCRIPTION	DRAWN BY	CHECK BY
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1	11 SEPTEMBER 1983	DRAFT FINAL REPORT		
2	28 FEB 1984	INTERIM REPORT		

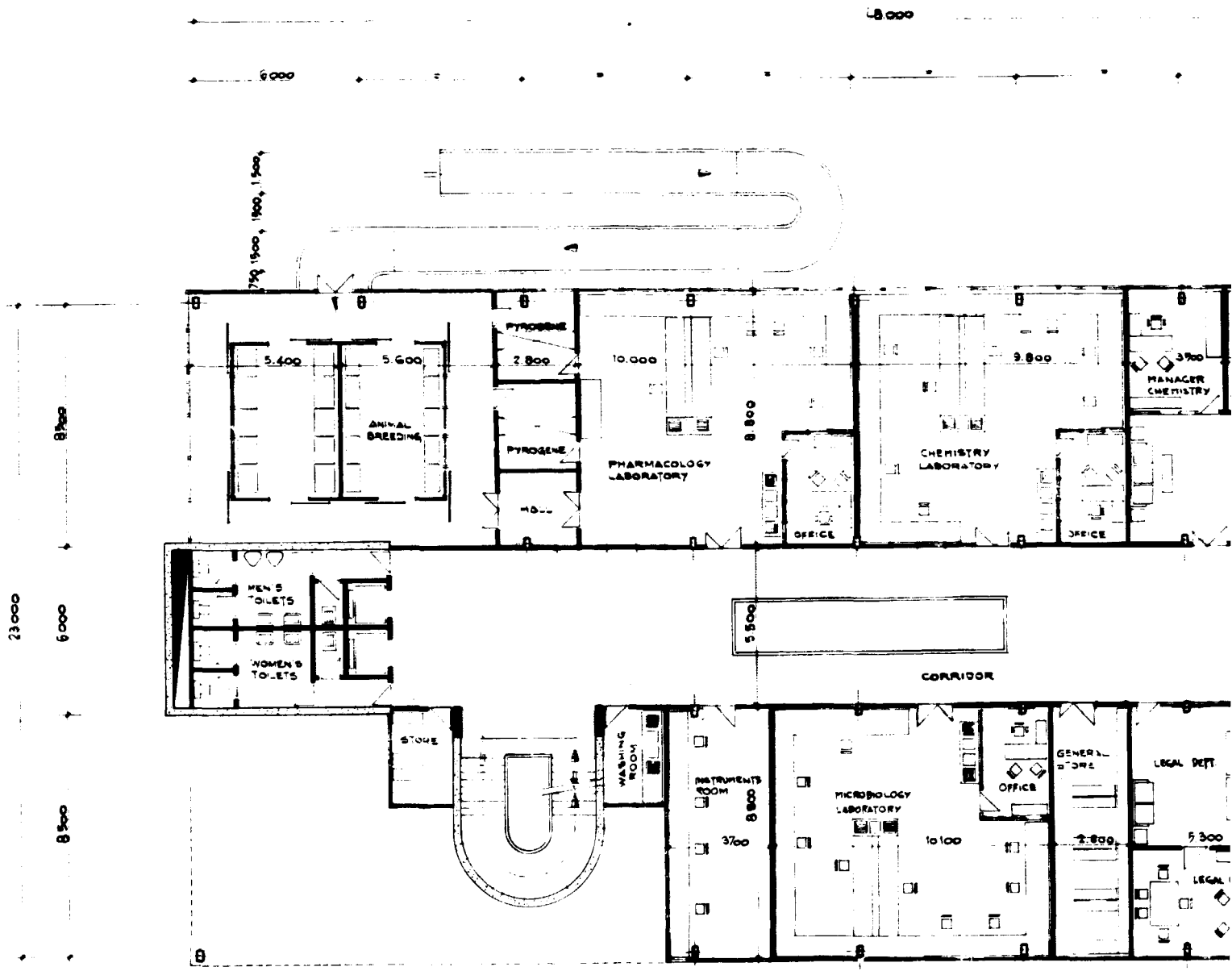
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**GROUND FLOOR PLAN**  
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SHEET 12 OF 12

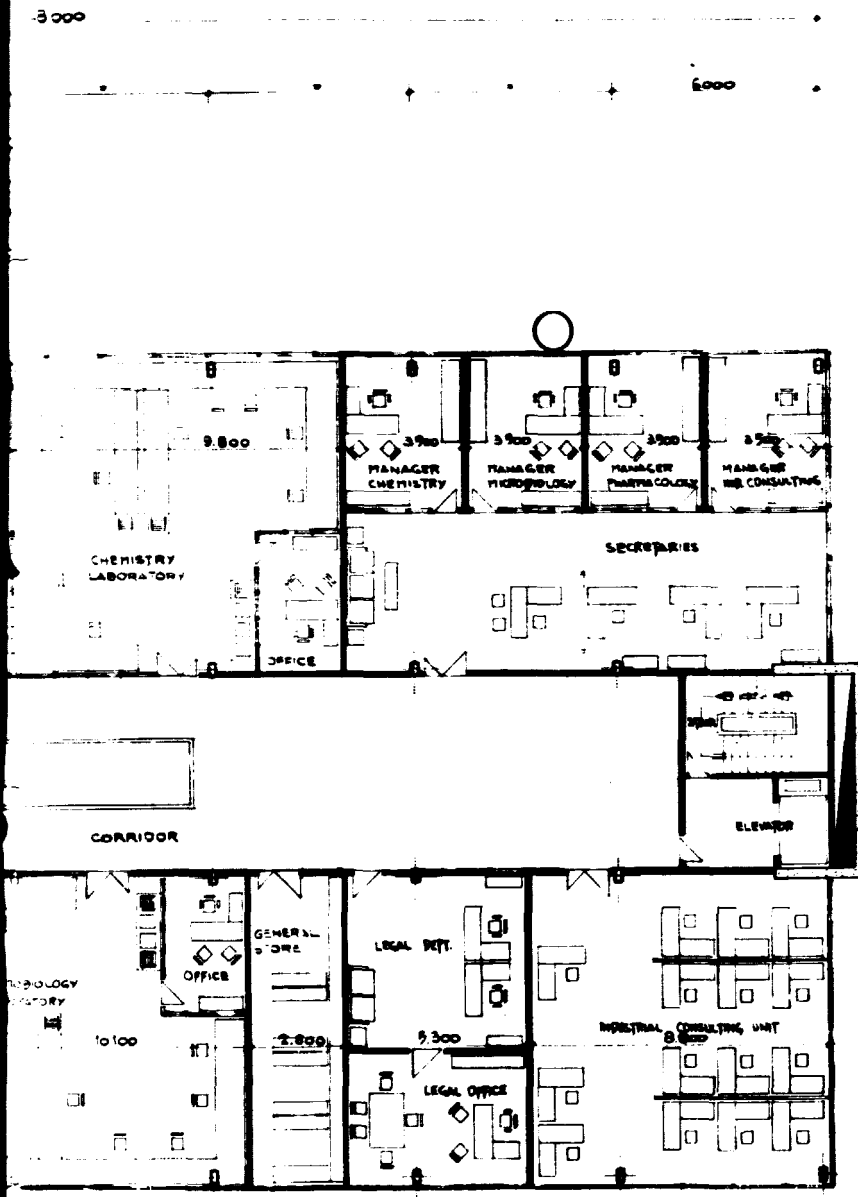


**SECTION 1**

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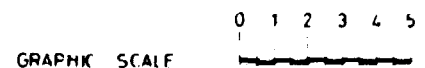
SYMBOLS

- ▲ ANIMAL ENTRANCE
- 1. ALL DIMENSIONS ARE INDICATED IN MILLIMETERS AND THE ELEVATIONS IN METERS



REFERENCE DRAWINGS

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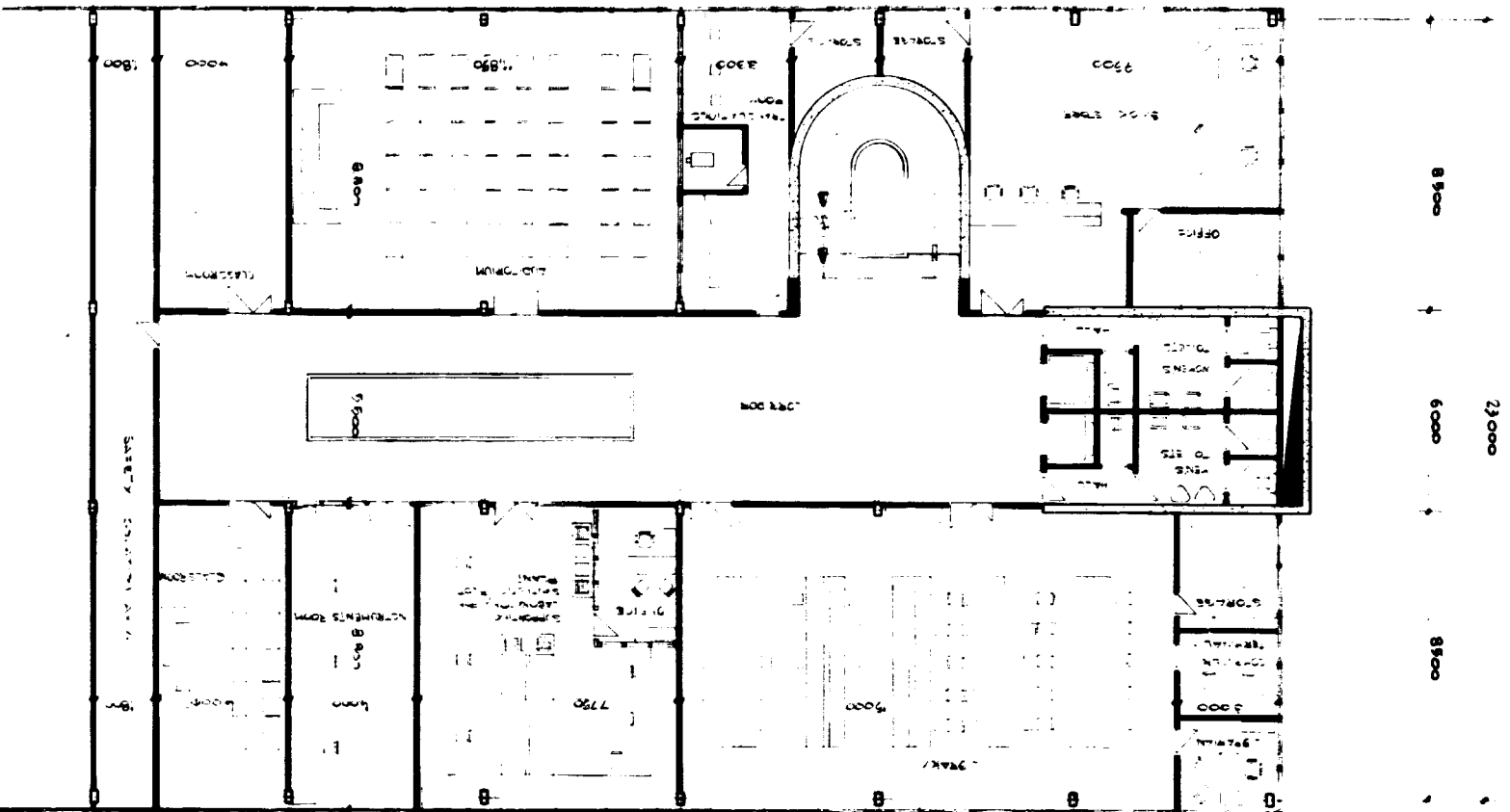
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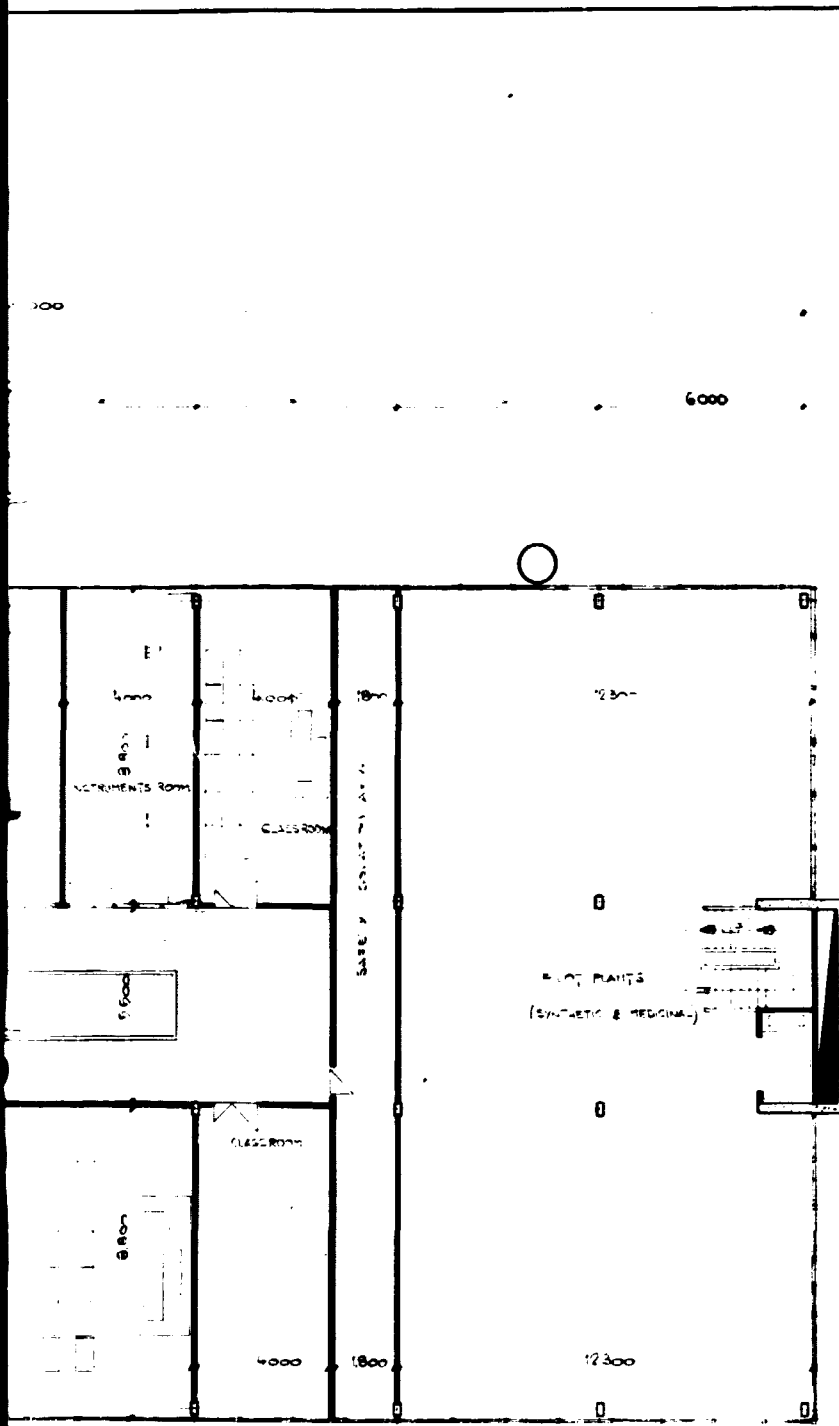
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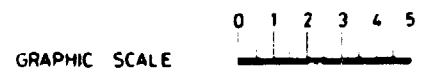


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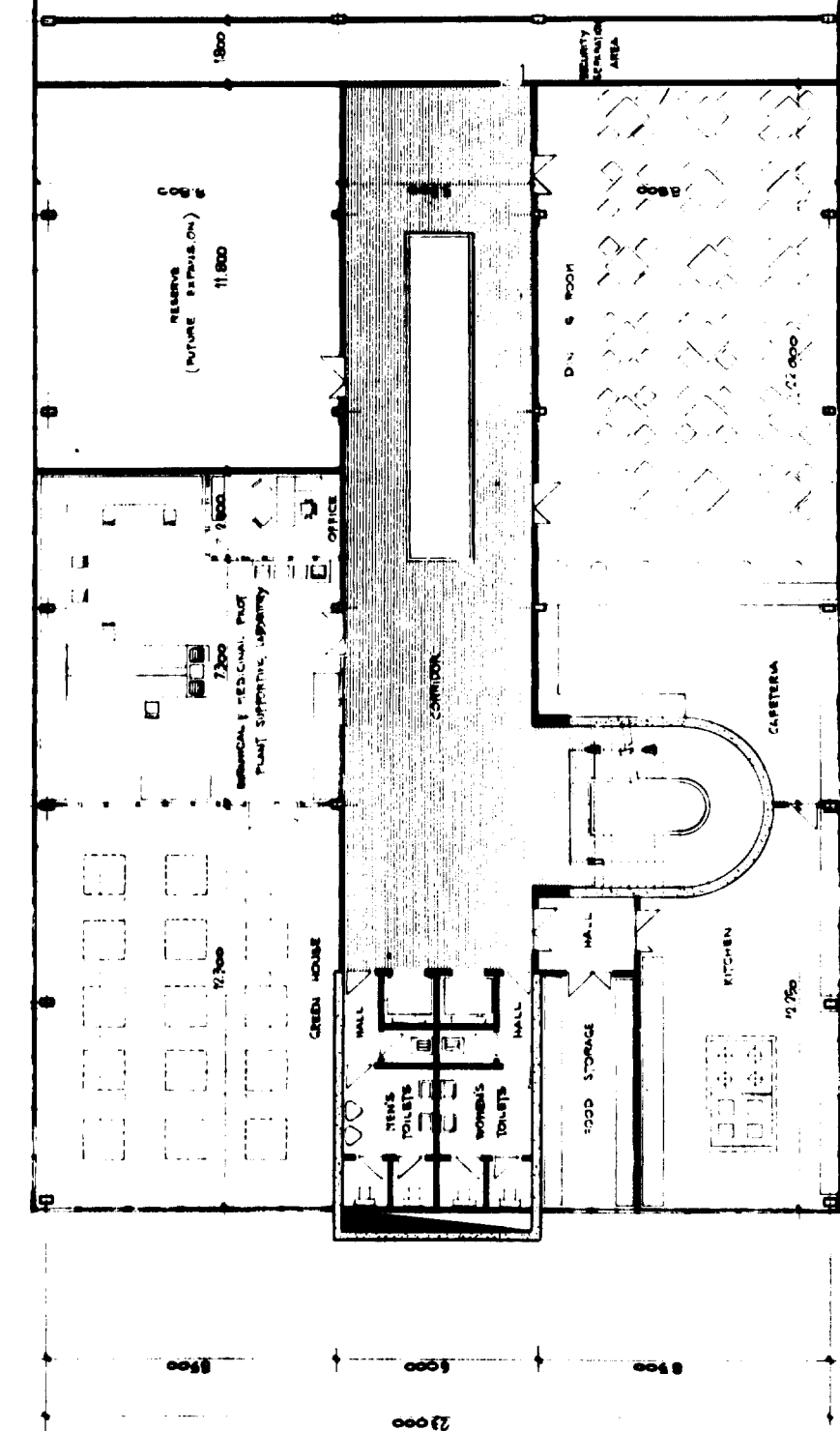
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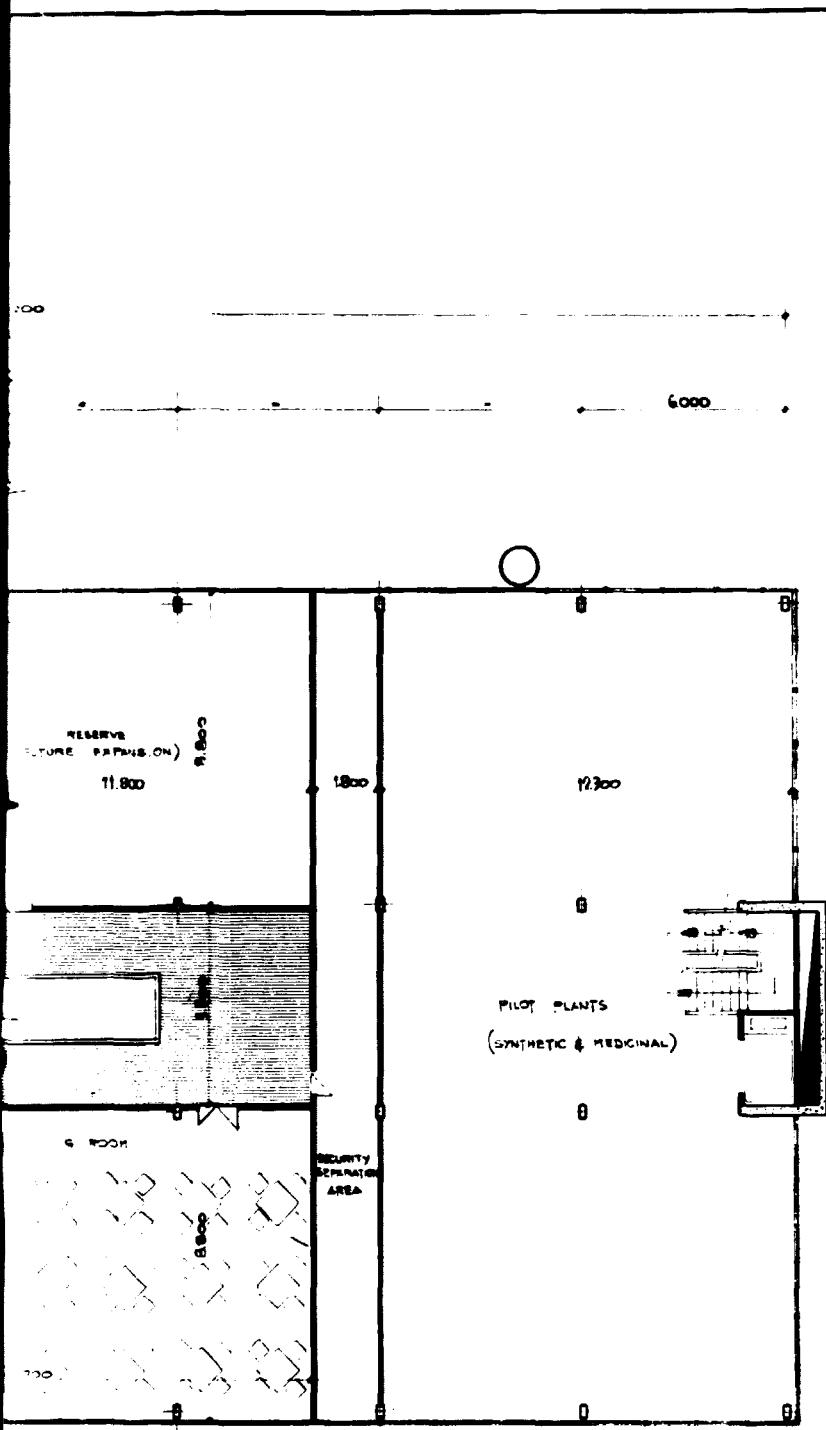
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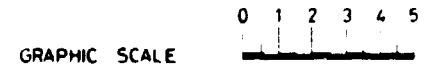
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(3 of 3)



UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO)  
(VIENNA)

FINAL REPORT  
FEASIBILITY STUDY FOR THE ESTABLISHMENT  
OF AN INTERNATIONAL CENTRE FOR INFORMATION,  
TRAINING AND DEVELOPMENT OF PHARMACEUTICAL TECHNOLOGY  
(ITPT)

UNIDO PROJECT UC/INT/82/102

VOLUME III

FINANCIAL AND LEGAL MATTERS

Prepared by  
FOSTER WHEELER IBERIA, S.A. (FWM)  
FWM Reference: MDC 6012

October, 1983

## TABLE OF CONTENTS

	<u>Page number</u>
 <b><u>VOLUME I - EXECUTIVE SUMMARY</u></b>	
TABLE OF CONTENTS	i
FOREWORD	v
EXPLANATORY NOTES	vii
INDEX OF TABLES, CHARTS AND DRAWINGS	ix
 <b><u>CHAPTER I - ABSTRACT</u></b>	
ARTICLE I-1	I-1
ARTICLE I-2	I-2
ARTICLE I-3	I-2
ARTICLE I-4	I-5
ARTICLE I-5	I-16
ARTICLE I-6	I-17
ARTICLE I-7	I-18
ARTICLE I-8	I-21
ARTICLE I-9	I-26
ARTICLE I-10	I-28
ARTICLE I-11	I-31
ARTICLE I-12	I-32
ARTICLE I-13	I-34
ARTICLE I-14	I-38

	<u>Page number</u>
<u>CHAPTER II - ACKNOWLEDGEMENTS</u>	I-43
<u>CHAPTER III - COUNTERPARTS</u>	I-45
<u>CHAPTER IV-1 - PROJECT BACKGROUND</u>	
ARTICLE IV-1      PROJECT BACKGROUND	I-47
ARTICLE IV-2      PROJECT PROMOTER	I-48
ARTICLE IV-3      PROJECT HISTORY	I-48
ARTICLE IV-4      FEASIBILITY STUDY AUTHORS	I-49
<u>EXHIBIT I-1 - TERMS OF REFERENCE PROVIDED BY UNIDO</u>	-
<u>EXHIBIT I-2 - GENERAL INFORMATION ABOUT THE CONSULTANT (FOSTER WHEELER IBERIA, S.A.)</u>	-

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**VOLUME II - POTENTIAL MARKET, ACTIVITIES AND  
DESCRIPTION OF THE ITPT CENTRE**

TABLE OF CONTENTS	i
FOREWORD	v
EXPLANATORY NOTES	vii
INDEX OF TABLES, CHARTS AND DRAWINGS	ix
<u>CHAPTER I - CENTRE'S POTENTIAL MARKET SURVEY</u>	
ARTICLE I-1      INTRODUCTION	II-1
ARTICLE I-2      METHODOLOGY	II-1
ARTICLE I-3      SUMMARIZED STATISTICS FROM THE MARKET SURVEY	II-11
ARTICLE I-4      RESULTS FROM THE MARKET SURVEY. THE ITPT CENTRE PROGRAMME	II-55

	<u>Page number</u>
<u>CHAPTER II - THE ITPT CENTRE ACTIVITIES AND PROGRAMME</u>	II-59
<u>CHAPTER III - THE ITPT CENTRE FACILITIES DESCRIPTION</u>	
ARTICLE III-1 THE ORGANIZATION AND STAFF OF THE CENTRE	II-63
ARTICLE III-2 THE BUILDING DESCRIPTION AND ITS INSTALLATIONS	II-67
ARTICLE III-3 EQUIPMENT LIST	II-73
ARTICLE III-4 CONSUMABLES LIST	II-104
ARTICLE III-5 IMPLEMENTATION SCHEDULES	II-111
<u>EXHIBIT II-1 - QUESTIONNAIRE ISSUED TO DEVELOPING COUNTRIES</u>	-
<u>EXHIBIT II-2 - DESCRIPTIVE DRAWINGS</u>	-

---

VOLUME III - FINANCIAL AND LEGAL MATTERS

TABLE OF CONTENTS	i
FOREWORD	v
EXPLANATORY NOTES	vii
INDEX OF TABLES, CHARTS AND DRAWINGS	ix
<u>CHAPTER I - INSTITUTIONAL STATUS</u>	
ARTICLE I-1 GENERAL CONSIDERATIONS	III-1
ARTICLE I-2 SUGGESTED POSSIBILITIES	III-5
ARTICLE I-3 MAIN ADVANTAGES AND DISADVANTAGES	III-6
ARTICLE I-4 SUGGESTED ASPECTS TO BE CONSIDERED IN THE IMPLEMENTATION AGREEMENT	III-7
ARTICLE I-5 ESTABLISHMENT IN THE HOST COUNTRY	III-10

	<u>Page number</u>	
<u>CHAPTER II - FINANCIAL EVALUATION</u>		
ARTICLE II-1	INTRODUCTORY NOTE	III-11
ARTICLE II-2	CENTRE'S MARKET FORECAST SUMMARY	III-15
ARTICLE II-3	CENTRE'S SALES UNIT PRICES	III-15
ARTICLE II-4	CENTRE'S CAPACITIES AND MAXIMUM OVERALL SALES CAPABILITY	III-17
ARTICLE II-5	BASIS OF THE FINANCIAL STUDY	III-19
ARTICLE II-6	INVESTMENT COSTS	III-25
ARTICLE II-7	FINANCING COSTS	III-29
ARTICLE II-8	OPERATING COSTS AND WORKING CAPITAL	III-29
ARTICLE II-9	FINANCIAL EVALUATION	III-34
ARTICLE II-10	CONCLUSIONS FROM THE FINANCIAL EVALUATION	III-47
ARTICLE II-11	RECOMMENDATION	III-48
<u>EXHIBIT III-1 - COMPUTER RUNS FOR FINANCIAL ANALYSIS</u>		-
<u>EXHIBIT III-2 - FINANCING SOURCES</u>		-

## FOREWORD

UNIDO, in response to a suggestion from groups of countries in the course of the First Consultation of the Pharmaceutical Industry held at Estoril, Portugal in December 1980, considered the possibility of establishing an International Centre for Information, Training and Development of Pharmaceutical Technology, hereinafter referred to as the ITPT Centre. It was envisaged that the Centre could undertake applied research and adapt technologies on behalf of governments and industry in developing countries as well as conduct related activities such as quality control, training personnel and providing technical information.

At a follow-up meeting held in Mohammedia, Morocco, on Co-operation, UNIDO announced that the Developing Countries were interested in establishing such a Centre and would soon discuss the project with UNIDO officials. It was suggested that the proposed Centre should concentrate on process development for drugs produced by chemical synthesis and by extraction from medicinal plants. It was understood that a research centre for producing drugs, in particular antibiotics by fermentation process, would be established with UNIDO support at another location.

As result of these discussions and further investigations, the requirements for a Feasibility Study were established and so stated in a Terms of Reference. These Terms of Reference were discussed with official banking institutions and modified accordingly to include their requirements covering the economic information presentation and content. These Terms of Reference are included in Exhibit I-1 to Volume I of this Feasibility Study.

This Feasibility Study has been done, therefore, in accordance with said Terms of Reference, and designed to provide techno-economical information and findings on the needs, objectives, activities, feasibility and definition of the ITPT Centre. The study consists of three (3) volumes, which are as follows:

o Volume I - Executive Summary

This volume contains information in a condensed form about the objectives of the Centre, activities of the consultant, results of the centre's potential market survey, the centre definition and operating costs, conclusions and recommendations. Cross-references to the Volumes II and III and to the Terms of Reference are given in this volume for those points that require a deeper investigation or supporting data and details.

o Volume II - Potential Market, Activities and Description of the ITPT Centre

This volume covers in detail the potential market survey, the summarized statistics resulting from the survey, the various alternatives for the ITPT Centre facilities, its installation and equipment, its staff, implementation schedule and descriptive drawings.

EXHIBIT II-1 - contains the questionnaire issued to developing countries.

o Volume III - Financial and Legal Matters

This volume deals with the considerations and possibilities investigated for the legal situation of the ITPT Centre, and with the financial evaluations for the various alternatives proposed. Detailed cost schedules (both for investment and operating costs), income schedules, and financial evaluation factors, curves and calculations are included herein.

This study has been prepared by Foster Wheeler Iberia in accordance with the Terms of Reference and the agreements reached with the United Nations Industrial Development Organization (UNIDO). The group that performed the study, their background and activities for this study, and Foster Wheeler Iberia's background have been presented in Volume I, Chapter IV, Article IV-4, and in EXHIBIT I-2.

In general the external sources of information utilized in the preparation of this study have been:

- UNIDO Publications
- WHO Publications
- IMS Publications
- SRI Reports
- IRL Reports
- Foster Wheeler data bank
- SCRIPT and other medical and pharmaceutical publications
- ABS Publications



## EXPLANATORY NOTES

A dash (-) is used to indicate amounts that are nil or negligible.

A blank means that information is not given or is not applicable.

A slash between dates (e.g. 1982/1983) indicates a financial year.

The use of a hyphen between dates (e.g. 1980-1983) indicates the full period involved (e.g. beginning of 1980 until end of 1983).

A period (.) is used to indicate decimals.

A comma (,) is used to distinguish thousands and millions.

Percentage rates, commissions, fees, etc. are per annum, unless otherwise indicated.

References to "tons" are to metric tons.

Totals may not add up precisely because of rounding off.

In addition to common abbreviations, symbols and terms, the following abbreviations have been used in this study:

### General

TOT	Transfer of Technology
NGO	Non-governmental organization
p.a.	Per annum
LDC	Less developed country
ITPT	International Centre for Information, Training and Development of Pharmaceutical Technology
NCE	New chemical entity
OTC	Over the counter sold drugs
Bulk Drugs	Drugs used as raw materials to produce formulated finished forms
SD	Synthetic drug
MPDD	Medicinal plant derived or extracted drugs
QC	Quality control
PP	Pilot plant
n.a.	Not applicable

### Financial or Economic

LIBOR	London interbank offered rate
SIBOR	Singapore interbank offered rate
DFC	Development finance company
f.o.b.	free on board
SDR	Special drawings rights

### Organizations

UNIDO	United Nations Industrial Development Organization
EEC	European Economic Community
IFC	International Finance Corporation
IBRD	International Bank for Reconstruction and Development (World Bank).
IDA	International Development Association
OAPEC	Organization of Arab Petroleum Exporting Countries
OPEC	Organization of Petroleum Exporting Countries
OECD	Organization for Economic Co-operation and Development
IMF	International Monetary Fund
UNCTAD	United Nations Commission on Trade and Development
UNDP	United Nations Development Programme
WHO	World Health Organization
FWM	Foster Wheeler Iberia (Consultant)

The description and classification of countries and territories in this study and the arrangement of the material do not imply the expression of any opinion whatsoever on the part of the secretariat of UNIDO or the consultant concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries, or regarding its economic system or degree of development.

Mention of company names and commercial products does not imply the endorsement of UNIDO or the consultant.

## INDEX TO TABLES, CHARTS AND DRAWINGS

		<u>Page number</u>
<b><u>VOLUME I - EXECUTIVE SUMMARY</u></b>		
TABLE I-1	SUMMARY OF EXPECTED OVERALL REVENUES	I-24
TABLE I-2	ILLUSTRATIVE BREAKDOWN OF SERVICES	I-25
TABLE I-3	SUMMARY OF INITIAL INVESTMENT COST	I-34
TABLE I-4	SUMMARY OF OPERATING COST (Current Values)	I-35
TABLE I-5	SUMMARY OF FINANCIAL EVALUATION	I-36
<b><u>VOLUME II - POTENTIAL MARKET, ACTIVITIES AND DESCRIPTION OF THE ITPT CENTRE</u></b>		
METHODOLOGY DIAGRAM Nº 1	SYNTHETIC DRUGS	II-5
METHODOLOGY DIAGRAM Nº 2	MEDICINAL PLANT DERIVED DRUGS	II-6
METHODOLOGY DIAGRAM Nº 3	FORMULATION AND PACKAGING PILOT PLANTS	II-7
METHODOLOGY DIAGRAM Nº 4	ANALYTICAL AND QUALITY CONTROL UNIT	II-8
METHODOLOGY DIAGRAM Nº 5	TRAINING SERVICES	II-9
METHODOLOGY DIAGRAM Nº 6	ENGINEERING AND ADVISORY SERVICES	II-10
TABLE II-1-A	SUMMARY OF ESSENTIAL DRUGS CLASSIFIED BY THERAPEUTIC GROUPS	II-13
TABLE II-1-B	RAW MATERIALS AND INTERMEDIATES REQUIRED TO PRODUCE ESSENTIAL DRUGS	II-17
TABLE II-1-C	CONSUMPTION OF PHARMACEUTICAL PRODUCTS IN THE WORLD	II-23

		<u>Page number</u>
TABLE II-1-D	CONSUMPTION OF PHARMACEUTICAL PRODUCTS IN SELECTED DEVELOPING COUNTRIES	II-24
TABLE II-1E	CONSUMPTION OF PHARMACEUTICAL PRODUCTS BY THERAPEUTIC GROUPS	II-23
TABLE II-II	PREVAILING DISEASE PATTERN IN DEVELOPING COUNTRIES (By Regions)	II-25
TABLE II-III-A	TOTAL POPULATION INCREASE & AVERAGE ANNUAL GROWTH RATES FOR DEVELOPING COUNTRIES TO YEAR 2000	II-26
TABLE II-III-B	SOCIO- ECONOMIC PROFILE IN SELECTED DEVELOPING COUNTRIES	II-27
TABLE II-IV	ESSENTIAL DRUGS REQUIRED IN DEVELOPING COUNTRIES IN RELATION WITH PREVAILING DISEASES	II-30
TABLE II-V	PHARMACEUTICAL INDUSTRY PROFILE IN SELECTED DEVELOPING COUNTRIES	II-31
TABLE II-VI	SELECTED DRUGS REQUIRED AND WHICH HAVE A POTENTIAL TO BE PRODUCED IN DEVELOPING COUNTRIES	II-35
TABLE II-VII	RAW MATERIALS AND INTERMEDIATES REQUIRED TO PRODUCE ESSENTIAL DRUGS WITH TOP PRIORITY	II-36
TABLE II-VIII-A	AVAILABLE TECHNOLOGIES TO PRODUCE SELECTED ESSENTIAL DRUGS WHICH SHOULD HAVE PRIORITY. PATENT STATUS AND SOURCES	II-37
TABLE II-VIII-B	ILLUSTRATIVE USAGE OF OPERATING PROCESSES BY THERAPEUTIC GROUPS	II-38
TABLE II-IX-A	MEDICINAL PLANTS AVAILABLE IN DEVELOPING COUNTRIES AND THEIR ACTIVE SUBSTANCES BY THERAPEUTIC GROUPS. QUALITATIVE MARKET STATUS AND TREND	II-44
TABLE II-IX-B	DEVELOPING COUNTRIES MEDICINAL PLANT MATERIAL EXPORTS TO THE E.E.C. AND THE U.S.A.	II-48

		<u>Page number</u>
TABLE II-X	MEDICINAL PLANT DRUGS SUITABLE AND RECOMMENDED FOR PRODUCTION BY DEVELOPING COUNTRIES	II-49
TABLE II-XI	TECHNOLOGIES REQUIRED TO PRODUCE RECOMMENDED MEDICINAL PLANT DERIVED DRUGS. PATENT STATUS	II-50
TABLE II-XII-A	SELECTED ESSENTIAL DRUGS SUITABLE TO BE PURCHASED IN BULK FORM	II-52
TABLE II-XII-C	DIFFERENT TYPES OF FORMULATIONS	II-52
TABLE II-XII-B	ANCILLARY PRODUCTS REQUIRED TO FORMULATE DRUGS	II-53
TABLE II-XIII	RELATIVE IMPORTANCE OF DEVELOPED AND DEVELOPING COUNTRIES AS DRUG MARKETS	II-54
-----	ORGANIZATION CHART	II-65
TABLE II-XIV	DETAILED BREAKDOWN OF THE STAFF FOR THE VARIOUS ALTERNATES	II-66/67
SCHEDULE II-1	CONSTRUCTION SCHEDULE	II-112
SCHEDULE II-2	SCHEDULE FOR START OF ACTIVITIES	II-113
DRAWING 6012-A1-4701	GENERAL PERSPECTIVE	-
DRAWING 6012-A1-4702	ELEVATION	-
DRAWING 6012-A1-4703	SECOND BASEMENT	-
DRAWING 6012-A1-4704	FIRST BASEMENT	-
DRAWING 6012-A1-4705	GROUND FLOOR	-
DRAWING 6012-A1-4706	FIRST FLOOR	-
DRAWING 6012-A1-4707	SECOND FLOOR	-
DRAWING 6012-A1-4708	THIRD FLOOR	-

**VOLUME III - FINANCIAL AND LEGAL MATTERS**

TABLE III-1	UNIT SALES PRICES COMPARISON	III-16
TABLE III-2	ILLUSTRATIVE EXAMPLE FOR AVERAGE OR STANDARD SALE PRICES OF SERVICES	III-16
TABLE III-3	ITPT CENTRE OVERALL SALES CAPABILITY	III-20
SCHEDULE III-I-A	ESTIMATE OF INVESTMENT COST: PRE-IMPLEMENTATION CAPITAL EXPENDITURES	III-26
SCHEDULE III-I-B	ESTIMATE OF INVESTMENT COST: FIXED INVESTMENT COST	III-27
SCHEDULE III-I-C	SUMMARY SHEET. TOTAL INITIAL INVESTMENT COST	III-28
SCHEDULE III-2-A	ESTIMATE OF INDUSTRIAL COST	III-30/31/32
SCHEDULE III-2-B	WORKING CAPITAL DEFINITION	III-33
SCHEDULE III-3-A/B	BALANCE SHEETS (Base Case A and Alternate 3)	III-40/41
SCHEDULE III-4	SUMMARY OF EVALUATION RESULTS (Sensitivity Analysis)	III-42
CHARTS III-1-A/B	SENSITIVITY ANALYSIS TO INTEREST RATE (Base Case A and Alternate 3)	III-44/45
CHARTS III-2-A/B	SENSITIVITY ANALYSIS TO SALES, SALARIES AND INVESTMENT (Base Case A and Alternate 3)	III-44/45
CHARTS III-3-A/B	BREAK-EVEN POINT (Base Case A and Alternate 3)	III-46

## INSTITUTIONAL STATUS

This chapter responds to point 5 of the Terms of Reference

### I.1 GENERAL CONSIDERATIONS

Prior to establishing several possibilities for the Institutional Status of the Centre, it is interesting to note some characteristics which have to be considered in the definition of this Status.

#### A. Assistential Character

A basic feature of the Centre is its assistential character. The developing countries must participate on a basis of equality, or in accordance with the method which is adopted for the implementation and functioning of the Centre. This participation should be reflected both in the contributions, in the allocation of the managerial functions and in the nationality of the Centre's personnel.

#### B. Creation by means of an International Agreement

The Centre should be created by means of an International Agreement, which will determine its functions, management, administrative structure, contributions and other features of the respective statutes.

#### C. International Legal Staff

The Centre should be provided with its own International Legal Staff, qualified for contracting acts and execution of all acts required for their functions in accordance with the Laws and Regulations of the Host Country where the Centre will be located.

#### D. Revenues

In view of the functions that the Centre should perform and the need to generate funds for its own maintenance, the Centre could establish certain fees for its services, technology or products.

### E. International Status

The Centre should be provided with International Legal Status. This would provide its employees with certain privileges and immunities which are convenient to enable them operate effectively and to properly discharge their duties and functions. Such privileges and immunities are regulated by an international convention pursuant Art. 105 of the General Assembly of the United Nations. It should also be convenient that the Centre, as a Legal Body, enters into an agreement with the Host Country to regulate and govern their relationship with respect to the property rights, location and legal status of the Centre as an International Organization in the territory of the Host Country. The major subjects of the agreement could include:

1. Juridical personality.
2. Headquarter' seat and property of the Centre.
3. Immunities and privileges in respect to individuals.
4. Settlement of disputes.
5. Termination.

#### 1. Juridical Personality

The concept of "juridical personality" or "legal entity" applied to the ITPT confers a status on it which entitles it to act on its own in either municipal or international law. As far as International Organizations are concerned, operating as they do at both the international and the municipal level, juridical personality manifests itself at both levels, and naturally, international law to the former.

#### 2. Headquarters' (HQ') Seat and Property of the Centre

The main feature of the agreement under this heading is the extra-territoriality of the Centre Headquarters' Seat. The laws of the Host Country shall apply within the Centre Headquarters' area, and the courts of the Host Country shall have jurisdiction over acts done and transactions taking place here. However, the International Organizations have power to make regulations operative within the said area for the purpose of the proper execution of their functions. In the case of inconsistency between laws of the Host Country and the said regulations, the latter shall prevail to the extent of such inconsistency. If there is any dispute as to whether there is inconsistency, the said regulations shall apply, pending settlement in accordance with the procedure discussed below.

The Host Country will have the responsibility of protecting the Centre HQ' seats, which are inviolable. Officials of the Host Country may enter only with the consent of the Head of the Centre. The ITPT Centre has an obligation to prevent their seats from being used as a refuge by persons who are avoiding arrest under any laws of the Host Country.

The ITPT's property and assets are inviolable and immune from legal process of every kind and they enjoy freedom of communication, with immunity from censorship.



### 3. Immunities and Privileges in respect of Individuals

The agreements could confer immunities and privileges to three categories of individuals (i) representatives of the members states of the ITPT Centre, (ii) officials of the ITPT Centre, (iii) experts on "ad-hoc" missions on behalf of the ITPT Centre.

The important immunities and privileges normally enjoyed by the said individuals are as follows:

- a. Immunity from personal arrest and legal process in their official capacity;
- b. Inviolability for all papers and documents;
- c. Immunity from direct taxation, especially income tax on their salaries;
- d. Freedom of speech in the discharge of their duties which shall remain after their tenure of service;
- e. Laissez-passez to officials of the International Organizations;
- f. Certain import privileges for personal consumption or use.

Only officials at a senior level enjoy immunity similar to that of diplomats for both private and official acts.

It has long been recognized that immunities and privileges are conferred for the proper and efficient functioning of the International Organizations and to enable their officials to discharge their duties with independence. They are not extended for the personal benefit and comfort of individuals, and the Organizations have a duty to waive immunity in certain cases.

### 4. Settlement of Disputes

Disputes between the Host Country and the International Organization concerning the interpretation and application of the agreements should be settled by direct negotiation in the first instance. Should this prove abortive, they could be referred for final decision to arbitration by a tribunal of three (3) arbitrators; one each to be chosen by the parties concerned and the chairman of the tribunal to be chosen by the two arbitrators. Should the two arbitrators fail to agree upon the chairman he could be chosen by the President of the International Court of Justice at the request of either party.

During the arbitration either party may ask or request from the International Court of Justice an advisory opinion on any legal question arising in the course of such arbitration. Pending the receipt of the Court's opinion, an interim decision of the tribunal shall be observed by the parties. Thereafter, the tribunal shall render a final decision having regard to the Court's opinion.

### 5. Termination

The agreement could provide the termination clause either by mutual consent of the parties or if the ITPT Centre permanently leaves the territory of the Host Country.

### F. Independency and Autonomy

The Centre should be independent from any country, national and international organization, and should be autonomous to implement and develop its own functions, so that its General Director becomes the ultimate decision making level.

The funds and revenues for the Centre should be expressly directed to the Centre itself.

### G. Contributions

The analysis of this point could include the following aspects:

#### G.1 Public and Private Character

In principle, and in accordance with the proposed characteristics of the Centre, it is to be assumed that this would be set up completely or fundamentally with public contributions from various countries or from official Financing Institutions. The public character of the contributions does not imply that the services of the Centre will be directed solely to the public sector. Its activities will be directed at least towards satisfying the requirements of the private and public sectors of the developing countries, without distinctions. The possibility to satisfy demands, public or private, from developed countries could be considered as a way to obtain funds and expand the experience of the Centre. Possible participation of private investors in the capital should not be entirely excluded, if the Centre takes the form of an International Private Company. However, this possibility is not recommended because it would hinder the assessments of public funds and would complicate or eliminate the possibility of a recognized International Status for the Centre and its employees. This would not create confidence among the developing countries and would diminish the attractiveness of a special status for the staff, which would, in turn, make the task of personnel recruitment more difficult.

#### G.2 Nature

Financial contributions, or contributions in kind (facilities, equipment, etc.) could be accepted. If the Centre is set up as an International Public Company, contributions should be made at the time of constitution. If it were an Intergovernmental Entity, it is possible to consider an initial contribution and annual quotas in accordance with the amount of each country's contribution.

### G.3 Participation by Countries

If the form of an International Public Company is selected, the participation of each country could be graded in accordance with its interest. The constitutive Agreement ought to lay down the respective shares, without eliminating the possibility to accept new members.

In the case of an Intergovernmental Entity, the countries could negotiate, and the Agreement could fix, the amount of each country's share. The degree of development of the pharmaceutical industry, the consumption of drugs and other more specific variables should be taken into account to define the participation.

### G.4 Non-Transferability

The participating governments would not be able to transfer their share in the Centre to third parties, except to public institutions in the same country.

### H. National Preferential Treatment

The Centre ought to receive the same treatment in the Host Country as National Firms or Entities for fiscal purposes, or for obtaining promotional benefits (for example, for exports). In addition, the constitutive Agreement could establish special benefits for the activities of the Centre in the developing countries, such as import duties and income tax exemptions, simplified immigration formalities for its employees, etc.

## I.2 SUGGESTED POSSIBILITIES

From the General Considerations stated in Article I-1 the following possibilities are suggested for consideration for the Centre's Institutional Status. However the final decision must be made by the member governments.

### Posibility nº 1

To establish the ITPT Centre as an Independent International Body under Multilateral Convention ratified by the interested governments.

### Posibility nº 2

To establish the ITPT Centre as a subsidiary of UNIDO/United Nations.

### Posibility nº 3

To establish the ITPT Centre under the auspices of the Host Country as an Institution in accordance with the applicable laws. The ITPT Centre could be linked to UNIDO for cooperation, or the Host Country Government (or any other government) could form a Foundation and invite other governments to contribute towards it.

From the discussion in Article III-3 below, only the first two possibilities are emphasized.

### 1.3 MAIN ADVANTAGES AND DISADVANTAGES

#### Possibility nº. 1 Independent International Body

The main advantage of the ITPT Centre with an Independent International Body Status supported by the member governments is that they will be more interested in running the ITPT Centre, in using its services and in making sure it continues to run successfully, since they are getting the benefits from the ITPT Centre directly.

The main disadvantage is the possibility of different opinions from the various governments which could make operation of the ITPT Centre difficult. Additionally, the Host Government or any other appointed member government should act as guarantor of the loan, should financing be provided by a banking system. Also the multilateral agreement must be ratified by the local parliaments.

#### Possibility nº 2: Subsidiary of UNIDO/UN

The main advantage of establishing the ITPT Centre as a UNIDO Centre or UNIDO subsidiary, is that UNIDO/UN are well qualified to assure that it runs successfully and in obtaining collaboration among member governments.

The main disadvantages are the possible legal and procedural problems involved in establishing it as a UNIDO Centre, due to the need at this moment to go through the United Nations General Assembly for approval for the establishment of the Centre and for any financial commitment that UNIDO could incur. If no financial commitments are to be taken by UNIDO, the establishment of a UNIDO Centre should be easier.

In fact, the steps to establish the Centre as a UNIDO Centre are:

- a) Approval by the UNIDO Board.
- b) Approval by the United Nations General Assembly. To get the U.N. General Assembly approval, several set criteria must be fulfilled:
  1. That no financial contributions by UNIDO/UN are required from U.N.'s regular budget.
  2. If UNIDO has to commit itself for financial contribution or support, a special budget has to be set up apart from the ordinary budget, and this is very difficult to obtain.
  3. If UNIDO has to act as a loan guarantor, the matter has to be approved by the U.N. General Assembly and again this approval is difficult to obtain.

The Centre could still be a UNIDO Centre if the financing comes from a banking system and the Host Government or other government acts as loan guarantor, so that no funding has to be requested from the United Nations Regular Budget.

Possibility nº 3: Institution or Foundation auspiced by the Host Country

The main advantage is the possibility of using UNIDO's experience and ability, and the fact that the ITPT Centre could be more easily established than as a UNIDO Centre, because of the procedure for establishment.

The main disadvantage would be the difficulty to accept the Centre as an Independent International Institution and that it could generate a lack of confidence on the part of developing countries. Therefore this alternative is not considered as being too feasible at this moment.

I.4 SUGGESTED ASPECTS TO BE CONSIDERED IN THE IMPLEMENTATION AGREEMENT

The agreement for the establishment of the ITPT Centre in the Host Country should be prepared and signed between the member Governments and the Host Country or between UNIDO and the Host Country, depending on which alternative is selected by the member governments. However such agreement could cover the following aspects:

1. Functions

The ITPT Centre will exercise those functions assigned to it by the Implementation Agreement in relation to its activities.

2. Status of the ITPT Centre

The premises of the ITPT Centre and the residence of the General Director and his Deputy shall be inviolable.

The appropriate Host Authorities shall exercise due diligences to ensure the security and protection of the premises of the ITPT Centre and of the ITPT Centre's staff.

The appropriate Host Authorities shall exercise their respective power to ensure that the ITPT Centre shall be supplied with the necessary public services and that such public services shall be supplied on equitable terms. The ITPT Centre shall enjoy privileged treatment for the use of telephone, radio-telegraph and mail communication facilities in the same conditions that are normally extended to diplomatic missions.

3. Facilities and Services

The Host Government shall provide, free of cost (see Note), appropriate land space for the ITPT Centre's building and installations.

Note: This Clause could also read "...shall provide against and annual rent of One (1) (state local currency unit),..."

#### 4. Officials of the ITPT Centre

- A. Officials of the ITPT Centre, except those who are locally recruited or have Host Country nationality or are permanent foreign residents of the Host Country, shall enjoy, within and with respect to the Host Country, the following privileges and immunities:
- a. Immunity from legal process of any kind in respect of words spoken or written, and of acts performed by them in their official capacity in connection with their work for the ITPT Centre, such immunity to continue notwithstanding that the persons concerned may have ceased to be officials of the ITPT Centre.
  - b. Immunity from seizure of their official baggage.
  - c. Immunity from inspection of their official baggage.
  - d. Exemption, with respect to themselves, their spouses, their dependents, relatives and other members of their households from immigration restrictions and alien registration.
  - e. Immunity from national service obligations.
  - f. The same privileges with respect of exchange facilities as are accorded to officials of comparable ranks forming part of diplomatic missions. In particular, the ITPT Centre officials shall have the right to bring into the Host Country reasonable amounts of foreign currency for the purpose of their work or for personal use, and at the termination of their assignment to the ITPT Centre, to withdraw from the Host Country, through authorized channels without prohibition of restriction, their funds, in the same amounts as they had brought into the Host Country, as well as any other funds for the lawful possession of which they can show good cause or as may be earned therein by them in the execution of their work.
  - g. The same protection and repatriation facilities with respect to themselves, their spouses, their dependent relatives and other members of their households as are accorded in time of international crisis to diplomatic envoys.
  - h. The right to import for personal use, free of duty and other levies, prohibitions and restrictions on imports:
    - i) their furniture and effects in one or more separate shipments, and thereafter to import necessary additions to the same including motor vehicles;
    - ii) reasonable quantities of certain articles for personal use or consumption and not for sale or to be used as gifts.
- B. In addition to the privileges and immunities specified in paragraph 4-A, the General Director and his Deputy shall enjoy, with respect to themselves, their spouses, their dependent relatives and other members

of their households, the privileges and immunities, exemptions and facilities normally accorded to diplomatic envoys of comparable rank. For this purpose, they shall be incorporated by the Host Country Ministry of Foreign Affairs into the Diplomatic List.

- C. All personnel of the ITPT Centre shall enjoy inviolability for all papers and documents relating to their work.
- D. Officials of the ITPT Centre locally recruited of Host Country nationality or permanent foreign residents in the Host Country, shall enjoy only, within and with respect to the Host Country, the privileges and immunities referred to in letters a), b), c), d) and g) of paragraph 4-A.

The conditions of work of these officials shall be solely governed by the provisions of the Staff Rules and Regulations of the ITPT Centre. No staff member may claim additional rights that those defined on said Staff Rules and Regulations.

- E. The ITPT Centre Director shall provide the Host Government with a list of the personnel of the ITPT to whom these privileges and immunities shall apply.

The privileges and immunities to which the ITPT and its personnel may be entitled, referred to in paragraphs above, may be waived by the General Director where, in his opinion, the immunity could impede the course of justice and can be waived without prejudice to the successful performance of the work or to the interests of the ITPT Centre.

- F. The privileges and immunities for which provision is made in the Agreement are granted solely for the purpose of carrying out effectively the aims and purposes of the ITPT Centre.
- G. Without prejudice to the privileges and immunities accorded by the Agreement, it is the duty of all persons enjoying such privileges and immunities to respect the laws and regulations of the Host Country.

5. General Provisions (Applicable only if the ITPT Centre is established as a UNIDO Centre)

- A. The provisions of the General Convention on Privileges and Immunities of the United Nations adopted by the General Assembly of the United Nations on 13 February 1946, shall fully apply to the UNIDO's ITPT Centre, and the provisions of the Agreement shall be complementary to those of the General Convention. In so far as any provision of the Agreement and any provision of the General Convention relate to the same subject matter, the two provisions should, where possible, be treated as complementary, so that both provisions should be applicable and neither shall limit the effect of the other.
- B. The Agreement should be constructed in the light of its primary purpose of enabling the UNIDO's ITPT Centre in the Host Country fully and efficiently to discharge its responsibilities and fulfill its purpose.

C. Consultations with respect to modifications of the Agreement should be entered into at the request of either party; any such modifications should be by mutual consent.

6. Termination

The Agreement shall cease to be in force:

- i) by mutual consent of both parties; or,
- ii) if the ITPT Centre is removed from the territory of the Host Country, except for such provisions as may be applicable in connection with the orderly termination of the operations of the ITPT Centre in the Host Country and the disposal of its property therein.

7. Salary Ranges

The Agreement could specify the salary ranges to be applied to the various staff levels.

8. The ITPT Centre Service Fees and Marketing Policies

The Agreement should leave free the Management of the ITPT Centre to fix the fees that the Centre will receive for its services, to plan and perform the marketing policies and to organize and plan the operations and the Internal Statutes of the Centre.

I.5 ESTABLISHMENT IN THE HOST COUNTRY

Based on the possibility of Portugal being the Host Country, the following has been established:

From the information received from the Portuguese Government Representatives, it may be stated that, apart from the International Agreement for the Constitution of the Centre, its legal situation and establishment in Portugal must be done under an "Accord de Siège" established between UNIDO Authorized Legal Representatives and the Portuguese Government, who are the only ones authorized to prepare and sign this document, assuming that the ITPT Centre is established as a UNIDO Centre.

It may be also stated that it is the intention of the Portuguese Government to make available the land of the area of the building, as covered by the conditions of Portuguese Law 2030. This law states that the propriety of the Land will always be of the Portuguese Government who lends it for long renewable periods to the Centre. Also it is the intention of the Portuguese Government to support during the initial years the salaries of ten (10) or twelve (12) technicians of Portuguese nationality. This support will cover only up to the Portuguese Civil Servant Salaries rates; the difference between these rates and the real rates will be on the Centre's account.

However, it may be convenient, depending on legal and other aspects that must be analyzed by the UNIDO and Portuguese Legal Departments, that the Centre pays a rent of one (1) Portuguese Escudo per year to the Portuguese Government, as a symbolic concept of rent for utilization of the land.



FINANCIAL EVALUATION

II.1 INTRODUCTORY NOTE

This chapter responds to points 7, 8 and 9 of the Terms of Reference.

This Financial Evaluation has been prepared to include either in itemized lists or in summarized forms enough information to make this evaluation a self-sufficient source of financial data to avoid the need to refer to other articles or volumes of the Feasibility Study. It has been made in response to points 7,8 and 9 of the Terms of Reference.

It has been considered convenient to summarize below the objectives, activities and character of the Centre described in Volumes I and II of the Feasibility Study to facilitate the understanding of this Financial Evaluation.

A. The main objectives of the ITPT Centre have been defined as:

- To back-up the developing countries in responding to their needs in health care.
- To develop technological capabilities to meet their pharmaceutical needs.
- To furnish information to strengthen their position in establishing and developing their pharmaceutical industry.
- To identify and develop human resources required by the pharmaceutical industry.
- To develop national pharmaceutical production.
- To improve the economics of health.
- To foster cooperation among developing countries towards establishing viable pharmaceutical industries.

B. Therefore, the activities of the ITPT Centre, have been outlined to provide:

- Information services.
- Advisory and technical assistance services.
- Analytical and quality control assurance services.
- Applied research for adaptation of technologies on pharmaceuticals for the production of synthetic and medicinal plant extracted drugs.
- Training services for each activity.

C. To achieve the above mentioned objectives and perform the activities outlined, the ITPT Centre facilities have been designed as follows:

BASE CASE

One single building with all services integrated consisting of the following:

- a. Analytical and Quality Control Unit, consisting of:
  - Chemistry laboratory.
  - Laboratory instrument room.
  - Microbiology laboratory.
  - Pharmacological laboratory with animal breeding facility.
- b. Semi-Industrial Scale Pilot Plant and supporting laboratories for applied research on technologies to produce:
  - Synthetic drugs (synthetic drug pilot plant and laboratory);
  - Medicinal plant extracted drugs (extraction pilot plant and laboratory).
- c. Semi-industrial Scale Formulation and Packaging Pilot Plant and Supporting Laboratories.
- d. Medicinal Plants Cultivation Area (green house) and Laboratory.
- e. Conventional and computerized library.
- f. Classrooms and conference rooms for training courses.

The proposed staff has been selected to operate and service these facilities at full capacity.

The building has been designed to allow expansion to approximately three times the actual capacity without any modification. This expanded capacity, when required can be achieved by increasing the amount of some laboratory apparatus and a certain percentage of the staff. The expanded sales capacity and additional investment and operating costs have not been considered in the Financial Evaluation.

Alternate n<sup>o</sup>. 1

One centre for applied research on synthetic drugs, consisting of:

- a. Semi-industrial Scale Pilot Plant and Supporting Laboratories for applied research of technologies to produce synthetic drugs..
- b. Laboratory scale formulation and packaging plant.
- c. Classrooms and conference rooms for training courses.

Alternate n<sup>o</sup>. 2

One centre for applied research on medicinal plant extracted drugs, consisting of:

- a. Semi-industrial Scale Extraction Pilot Plant and Supporting Laboratories for applied research of technologies to produce medicinal plant derived drugs.
- b. Laboratory scale formulating and packaging plant.
- c. Medicinal plants cultivation area (green house) and laboratory.
- d. Classrooms and conference rooms for training courses

Alternate no. 3

One centre for information, advisory services, quality control and formulation and packaging applied research, consisting of:

- a. Analytical and Quality Control Unit, including:
  - Chemistry laboratory.
  - Laboratory instrument room.
  - Microbiology laboratory.
  - Pharmacological laboratory with animal breeding facilities.
- b. Semi-industrial Scale Formulation and Packaging Pilot Plant and supporting laboratories.
- c. Conventional and computerized library.
- d. Classrooms and conference room for training courses.

Each alternative will have its own administrative and operational staff and the related required facilities and installations.

- D. Finally, the ITPT Centre is intended to be a non-profit making organization that becomes economically self-sufficient after a few years of operation.

The evaluation has been divided into the following Articles:

Article II-2 Centre's Market Forecast Summary

Summarizes the ITPT Center's potential market forecast, discussed in Volume II, Chapter I, to facilitate the reading of this volume and to make it self sufficient as a source of financial data.

Article II-3 Centre's Unit Sales Prices

States the Centre's unit sales prices and compares them with the average market sale prices for equivalent services.

Article II-4 Centre Capacities and Maximum Overall Sales Capability

Summarizes the Centre services capacities for each Unit as a result of the design of the proposed facilities and staff and

states the maximum sales volume expected of the centre for the proposed size.

Article II-5 Basis of the Financial Study

States the basis of the financial evaluation and defines the parameters and calculation procedures utilized.

Article II-6 Investment Cost

Summarizes the pre-investment and investment costs through the construction period and up until the start-up.

Article II-7 Financing Costs

States the costs produced by the financing of the construction of the facilities and those caused by the financing of the funds required during the first years of operation. These data are included in the computer run.

Article II-8 Operating Costs and Working Capital

Reviews in detail the operating costs including materials, labour, utilities, insurance, maintenance, marketing and other costs. Working capital requirements are also defined herein.

Article II-9 Financial Evaluation

Provides a summary of the input data schedules and evaluations for all cases analyzed, showing the changes in the conditions that may affect the profitability and sensitivity tests, due to swings up and down of the variables. All cases have been developed for a ten year period, from 1986 through 1995. This section also includes a description of the evaluations and the Balance Sheets. A summary of all the financial results is also included, together with the sensitivity curves and the break-even point chart.

Exhibit III-1 Computer runs for Financial Analysis

Contains computer print-outs for the financial analysis for each case evaluated. An explanatory sheet highlighting the relevant items in each evaluation precedes each computer run.

Exhibit III-2 Financial Sources

Lists the possible financial sources for development projects.

In reviewing this evaluation it should be kept in mind that the flexibility of the design of the ITPT Centre in its various alternatives allows that the Centre accommodates its service capacity to wide changes in demand as required to fulfill the health, social and economic circumstances of the countries and institutions serviced.

## II-2 CENTRE'S MARKET FORECAST SUMMARY

As indicated previously, it has not been possible yet to develop the "interest factor" from developing countries to back-up the market forecast. Therefore it has been estimated. The most realistic way for this type of institution is to use the manhour occupation method, that is explained in the next Article. A summary of the market forecast has been presented in Article II-4 together with a table of the equivalent number of services. This Table is based in average durations and manhour requirements for typical services. As explained in Articles II-3 and II-2 of this chapter, such figures may vary substantially. However the sales value forecasts will not depart too much from the values indicated, as they have been calculated considering the manhours available.

To avoid duplication of information, the Table III-3 named "ITPT Centre overall sales capability" included in Article II-4-B summarizes the maximum potential market that the Centre could service with its actual design and staff. As indicated also in Article II-4, the furnishing of the facility allows that a higher number of services could be provided, by increasing only the staff in response to demand fluctuations.

In view of all the above the market forecast has been estimated as follows:

First year of operation	:	50% of maximum capacity
Second year of operation	:	65% of maximum capacity
Third year of operation	:	80% of maximum capacity
Fourth year of operation	:	95% of maximum capacity
Fifth year of operation	:	100% of maximum capacity

Together with the table mentioned above, this is the most complete market forecast that can be given until developing countries express and commit themselves as to which services they will utilize.

## II-3 CENTRE'S UNIT SALES PRICES

The Centre's services unit sale prices have been considered to be about half (fifty per cent (50%)) of the actual market prices to foster the utilization of the services by developing countries which thereby will get a direct economic advantage as compared with the purchase of such services on the existing market.

For these type of services, the normal practice is to evaluate the costs in manhours expenditure and charge a price per manhour. Due to the enormous diversification of problems, projects or tests that have to be done, each case or demand has to be considered and evaluated individually, and the same procedure has to be used by the ITPT Centre when it has to sell its services. Therefore, the only realistic way to make this comparison is to utilize the sales price of composite technical manhours.

The composite technical manhours sales price includes the costs of wages, salaries, taxes, overheads etc, and the cost of chemicals, utilities and laboratory and pilot plant consumables other than raw materials. Profit is also included. This is the procedure used to evaluate the sales volume value of the ITPT Centre. Therefore the following prices have been considered:

TABLE III-1 (1)

UNIT SALES PRICE COMPARISON

SERVICE	MARKET	CENTRE
Quality Control Services	80	50
Applied Research Services	40	20
Production Services	40	20
Training Services (sale price of ITPT Training services)	60	30
Engineering and Advisory Services	50	25

Only as an illustrative example, based on average manhours and materials required for normal tests, scale-ups and research runs, or engineering and feasibility studies, the following Table III-2 is presented with the absolute value that could result for typical unit services. It is important to be aware that a chemical test on a new or special substance may cost one thousand times more than the average; or a pilot plant research programme or a feasibility study may also cost twenty or that ten times more, depending on the magnitude or specific characteristics of the problem.

TABLE III-2

ILLUSTRATIVE EXAMPLE OF AVERAGE OR STANDARD SALE PRICES OF SERVICES

SERVICE	MARKET UNIT PRICE (U.S. \$)	CENTRE'S UNIT PRICE (U.S. \$)
<u>Analytical Quality Control Unit</u>		
-Chemistry Lab.	240	150 per test
-Instrument Lab.	130	80 per test
-Microbiology Lab.	190	120 per test
-Pharmacology Lab.	1,000	600 per test
<u>Applied Research Unit</u>		
-Synthetic Drugs Pilot Plant and supporting laboratory	600,000	300,000 average per run
-Medicinal Plant Extracted Drugs Pilot Plant and supporting laboratory	500,000	250,000 average per run
-Formulation and Packaging Pilot Plant and supporting laboratory	224,000	112,000 average per run
-Packaging Pilot Plant and supporting laboratory	40,000	20,000 average per run
<u>Training Unit</u>		
-Quality Control	8,000	4,000 per person per course (1month)
-Pilot Plants	8,000	4,000 per person per course (1month)
-Engineering and Advisory	30,000	15,000 per person per course (3month)
<u>Industrial Unit</u>		
(Engineering and Advisory)	<u>100,000</u>	<u>50,000 per Feasibility Study</u>

1) Source: Consultant's own information.

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## II-4 CENTRE'S CAPACITIES AND MAXIMUM OVERALL SALES CAPABILITY

### A. Capacities

Based on the design, equipment and staff proposed and specified in Volume II of this study the following capacities can be achieved, based on 200 working days per year. The capacities are the same either for the base case or any alternative, on the understanding that only those services corresponding to the definition of each alternative are applicable.

#### 1. Quality Control Unit

##### a. Chemistry Laboratory

This laboratory has been equipped to have a daily minimum sample testing capacity of twenty five (25) tests, equivalent to five thousand 5000 normal tests per year.

##### b. Instrument Laboratory

This laboratory has been equipped to have a daily minimum sample testing capacity of twenty (20) tests, equivalent to four thousand (4000) normal tests per year.

##### c. Microbiology Laboratory

This laboratory has been furnished with equipment and staff to have a minimum daily sample testing capacity of forty (40) tests, equivalent to eight thousand (8000) tests per year.

##### d. Pharmacology Laboratory

This laboratory, complete with an animal breeding facility has been furnished to have a minimum daily sample testing capacity of ten (10) tests, equivalent to two thousand (2000) tests per year.

#### 2. Synthetic Pilot Plant and Supporting Laboratory

The Pilot Plant has been sized at semi-industrial scale and equipped to carry out two batches at a time and has been provided with a fully equipped supporting laboratory.

The amount of tests or scale-up runs that can be performed depends on the type of research work required. Therefore, and only to illustrate the evaluation, it has been assumed that a minimum of ten (10) production runs per year will be made. This means an average of 2 to 3 months per run and batch. This average time is considered reasonable for scale-up testing on well known products.

### 3. Medicinal Plants Derived Drugs Pilot Plant and Supporting Laboratory

This Pilot Plant has been sized at semi industrial scale and has the equipment to carry out two production runs or scale-up tests at a time. It is complemented with a fully equipped supporting laboratory, and a green house.

For the same reasons as stated in B, above, it has been assumed that it will be able to carry out six (6) runs per year.

### 4. Formulation and Packaging Pilot Plant and Supporting Laboratory

This Pilot Plant has been equipped to formulate and package all types of finished forms. It has been sized at semi-industrial scale and could operate on eight different forms at a time. It is complemented with a fully equipped supporting laboratory.

It has been assumed that it will be able to handle a minimum of fifty (50) tests or production runs per year. If only packaging production runs are considered, up to 150 average runs per year could be made for the same reasons as stated in B and C above.

### 5. Industrial Consulting Unit

The combined net technical manhours capability of this section is about seventeen thousand (17,000) manhours per year. Refer to the procedure to evaluate sales volume in paragraph II-4-B of this Volume.

### 6. Training Services

The capacity to give training services at the ITPT Centre, as a result of the installations and staff available, is as follows:

Quality Control Unit	: 72 trainees per year in 1 month courses
Pilot Plants Unit:	: 216 trainees per year in 1 month courses; 6 trainees per course per pilot plant.
Industrial Assistance Unit (Engineering, Advisory and Information services).	: 24 trainees per year in 3 month courses; 6 trainees per course

## B. Maximum Overall Sales Capability

The manhour method to measure sales capability and to evaluate the corresponding revenues has been selected because it is not practical (if not impossible) to estimate the number and size of all possible projects and consulting services until the actual definition of the project or problem is known. It is also a well known fact that engineering and consulting firms workloads are highly fluctuating because of the wide variety in size and type of projects. Occupation level forecasts or programmes can be made once the future potential markets are known and which projects may be awarded. On the other hand, manhour sales capacity is a recognized way to measure size and capability for these type of services.



Sales forecasts for this type of institution are normally given as percentages of total capacity or as manhours sold. For these reasons this method has been used as to be the most realistic to evaluate revenues. The marketing manager of the ITPT Centre should concentrate in achieving the planned percentage of manhours to be sold each year.

Consistent with the above capacities and using the unit sale prices stated in Article II-3 the maximum revenue volumes expected with the ITPT Centre at maximum capacity, are as stated Table III-3.

## II-5 BASIS OF THE FINANCIAL EVALUATION

### Basis nº. 1 - Funding

The funds for the establishment of the project may be obtained from different sources such as:

- a) Donations or investments from member countries.
- b) Donations or investments from the Host Country.
- c) Loans from official banking institutions.
- d) Donations from Foundations or governments.

Donations do not require repayment nor are any interest costs involved and it is anticipated that some funds may be obtained this way. Due to the concept that the I.T.P.T. Centre is not intended to be a profit making entity, but basically is to service the needs of developing countries and that it is to be an international centre, we are not considering in the financial evaluation the possibility of the Centre being built and operated utilizing investment capital, since we believe it would be very difficult to obtain such capital because of the nature of the Centre. Therefore, it has been considered that a loan from an official banking institution will provide the funds for the construction and furnishing of the Centre. This has been named Base Case A in the evaluations. Another alternative considered and studied separately in the Financial Evaluation, named Base Case B in the evaluations, is that the Host Country or other countries or institutions make available the building and seventy percent (70%) of the total value of its equipment, and they rent it to the Centre for a symbolic rent of one currency unit per year. The balance of the investment is assumed to be obtained from a loan from official banking institutions. In this assumption the loan should be obtained when the initial funds are used up, i.e., at the end of the construction period.

In the both hypothesis considered, this loan could also cover the difference between cash inflows and desimbursments until the Centre becomes economically self-sufficient.

The loan for the first hypothesis can be arranged in two ways:

- 1) With one single loan at the beginning of the construction, which means that more interest has to be paid and therefore, the total accumulated cost will be higher; or

T A B L E III-3

ITPT CENTRE OVERALL SALES CAPABILITY \* (PER YEAR)

CENTRE SERVICES UNIT	BASE CASE			ALTERNATIVE 1 ** Synthetic Drugs			ALTERNATIVE 2 ** Medicinal Plant Drug			ALTERNATIVE 3 ** Quality Control, Form. & Pack. & Inv. Unit		
	Techn. Manhours Available For Sale	Equivalent Revenue (\$)	Illustrative equivalence in services	Manhours Available	Equivalent Revenue (\$)	Illustrative Equivalent in Services	Manhours Available	Equivalent Revenue (\$)	Illustrative Equivalent in Services	Manhours Available	Equivalent Revenue (\$)	Illustrative Equivalence in Services
<b>Analitical Quality Control Unit</b>												
- Chemistry Lab.	9,600	480,000	3,200 tests	---	---	---	---	---	---	9,600	480,000	3,200 tests
- Instrument Lab.	4,800	240,000	3,200 tests	---	---	---	---	---	---	4,800	240,000	3,200 tests
- Microbiology Lab.	9,600	480,000	4,200 tests	---	---	---	---	---	---	9,600	480,000	4,200 tests
- Pharmacology Lab.	9,600	480,000	750 tests	---	---	---	---	---	---	9,600	480,000	750 tests
<b>Applied Research Unit</b>												
- Synthetic Drugs Pilot Plant and Laboratory	14,400 x 2 (note 1)	864,000	10 test runs	4,800 x 2 (note 1)	864,000	8 test runs	---	---	---	---	---	---
- Medicinal Plant Extracted Drugs Pilot Plant and Supporting Laboratory	12,200 x 2 (note 1)	732,000	6 test runs	---	---	---	12,200 x 2 (note 1)	732,000	6 test runs	---	---	---
- Green House	3,200	96,000	-----	---	---	---	3,200	96,000	---	---	---	---
- Formulation and Packaging Pilot Plant and Lab. (Research & Production)	19,200 x 5 (note 2)	2,880,000	50 test runs	---	---	---	---	---	---	19,200 x 5 (note 2)	2,880,000	50 test runs
<b>Industrial Unit</b>												
- Engineering and Advisory Services	17,600	440,000	na	---	---	---	---	---	---	17,600	440,000	na
<b>Training Unit</b>												
- Quality Control	na	280,000	72 trainees	na	---	---	na	---	---	na	280,000	72 trainees
- Pilot Plants	na	864,000	216 trainees	na	144,000	36 trainees	na	144,000	36 trainees	na	576,000	144 trainees
- Engineering & Adv.	na	360,000	24 trainees	---	---	---	---	---	---	na	576,000	144 trainees
<b>Information Unit</b>												
-	na	10,000	na	na	na	na	na	na	na	na	360,000	24 trainees
<b>TOTALS</b>	100,200	6,214,000	-----	14,400	1,008,000	---	15,400	972,000	---	70,400	6,214,000	---

\* These figures refer to prices in 1985. In the computer runs they appear escalated to the values in first and subsequent years after entering in operation (1986 and up). The escalation rates have been specified in Article II-5 "Basis of the Financial Study", of this Volume.

\*\* The concept of each alternative has been summarized in Article II-1 "Introductory Note" of this Volume, and fully discussed in Volume II, Chapter III.

Note - 1 Two parallel runs can be done at a time. Total saleable manhours not accounted for in total.

Note - 2 Five production or testing runs at a time can be made. Total saleable manhours not accounted for in total.

These capacities can be expanded without further modification of the building, by increasing the technical staff and duplication of a few apparatus.

- 2) With a loan at the beginning of the construction and a second small loan obtained at the beginning of the operation of the Centre covering a short period of about three (3) or four (4) years. This small loan has not been considered in the evaluations.

The second solution reduces the total financial costs of the Centre and has, therefore, been taken into consideration.

#### Basis n<sup>o</sup>.2 - Loan Terms and Conditions

- a) Loans from official banking institutions can be granted for maturity periods of five (5) to twenty (20) years and normally include a three (3) to five (5) years initial grace period during which no repayment has to be made. Therefore, it has been assumed that a loan with a maturity period of fifteen (15) years and with a five (5) year grace period can be obtained due to the characteristics of the ITPT Centre. (Note that the computer runs show a grace period of only three (3) years because the first two years are absorbed by the construction period since the loan is granted at the beginning of this period).
- b) A grace period of one (1) year is assumed for the small loan to cover operating cash deficits.
- c) A front-end fee of about 1.5% is usually charged for each loan commitment, based on the normal practice of most official banking institutions, and has been considered as a donation covered by the Host Country contribution, as explained below in Basis n<sup>o</sup>.3. Therefore, it has not been included in the calculations.
- d) The interest rate for the loans has been assumed as 7% annually. The sensitivity analysis shows what happens when other interest rates are applied.

#### Basis N<sup>o</sup> 3 - Host Country Contribution

It is normally expected that the Host Country makes contributions of some kind, either goods or services or cash, etc. towards the establishments and operation of the Centre. As the Host Country is not completely fixed at this moment, in the evaluations it has been considered that it will provide the land for the Centre at no cost, and will contribute at least 200.000 US\$ to the initial investment covering the initial fee of 1.5% of the loan. This has been a common assumption for all alternatives. These assumptions have been made based on the historic practice for this type of institution.

Another possibility has been studied, assuming that in addition to this contribution the Host Country or Foundations or member countries provide the building and seventy per cent (70%) of the equipment as indicated in Basis n<sup>o</sup>.1.

Additional possible contributions to cover a percentage of labour costs during two or three years have not been included in the analysis, due to their small relative importance.

#### Basis nº. 4 - Salary Rates

Several salary scales have been considered when accounting for personnel costs. The various average living expenses in the countries that could host the ITPT Centre have been considered, and the calculations have been made using average costs in developing countries and also the information provided by the country (Portugal) that has expressed its willingness to host the Centre. It has been assumed that a majority of the staff (especially auxiliary, administrative and a significant percentage of the technical staff) will be recruited locally. It is desirable that the salaries and wages are attractive for the people who will work in the Centre, as one of the means to promote dedication and professional satisfaction of the employees. Therefore, a factor of 1.2 (120%) has been applied to the maximum average salary rates reported (1).

This will also result in attractiveness to facilitate the recruitment of foreign scientists of developing countries who wish to work in the Centre. Three exceptions have been made to this philosophy:

- a) The General Director, which is suggested to be provided by UNIDO. Therefore a UNIDO/UN D-1 salary rate has been assumed.
- b) The Technical Manager. For the same reason as above, a UNIDO/UN P-4 salary rate has been considered.
- c) The Unit Chiefs. For these group, whose qualifications and duties require a satisfactory reward, a coefficient of 1.7 (170%) has been applied to the average corresponding salaries in developing countries. With the economic and social circumstances of the possible Host Country, this rate has been considered satisfactory.

Additional social security cost of 35% of the gross salaries has been added for all locally recruited personnel. For the D-1 and P-4 levels, only an additional 14% has been added.

Salary rates considered are gross rates. UNIDO pension funds, where applicable, staffs assessments and other social deductions, taxes, etc. have been included in these figures.

The computer runs show four (4) labour cost categories:

- Category A corresponds to salaries for expatriate employees, (D-1, P-4).
- Category B corresponds to salaries for technical staff locally recruited.
- Category C corresponds to salaries for administrative and maintenance staff locally recruited.
- Category D corresponds to staff travel expenses. (Due to requirements of the computer programme utilized, this concept has been included here.)

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(1) Source: Information obtained by the consultant from Portuguese Government representatives, and from consultant's own statistics.

#### Basis n<sup>o</sup>. 5 - Sales

It is expected to obtain some operating funds from member countries, amounting a minimum of three (3) millions US \$/year, corresponding, approximately to 39% of the operating costs for the first year in the Base case. This is equivalent to 36% of the Centre's sales capacity. Therefore, it has been considered that the overall sales in the first year of operation will be 50% of the total sales capacity. For the second year, an additional 15% sales increase has been considered, and a new increase of 15% in the third and fourth years. Full capacity is expected in the fifth year. The sensitivity analysis shows the effect of reducing or increasing these assumptions. Wide variations of the sales volume have been analyzed in the sensitivity analysis due to the uncertainty of sale forecasts.

#### Basis n<sup>o</sup>. 6 - Travel

An average of 102 trips per year has been considered at a rate of 2,700 US\$ per trip. This appears in the computer run as "Category D" labour cost, as explained in Basis n<sup>o</sup>. 4.

#### Basis n<sup>o</sup>. 7 - Other Costs

This concept includes funds for paying least developed countries training costs and visits to the Centre, telex and telephone costs, subscriptions to technical papers and office consumables. In the computer this concept has been considered under the heading "Utilities".

#### Basis n<sup>o</sup>. 8 - Raw Material Costs

This concept includes the cost of raw materials and chemicals, laboratory consumables, and that of subcontracted services such as security and maintenance personnel, cleaning of the premises, international computer connection, catering and consulting services. These latter items have been included in this category due to the requirements of the computer programme utilized.

#### Basis n<sup>o</sup>. 9 - Pay-out Period

Pay-out period is defined as the number of years required to make the ratio "own invested capital/ accumulated cash flow" equal to one. Since in this case the investment comes from a loan or from donations or because the facilities are given to the Centre, the payout is four (4) years, as it is shown in the Evaluation I print-out. On the basis of a capital investment amounting to one hundred (100%) of the total instead of a loan or donation, a computer run has been made that shows a pay-out period of eight (8) years, based on not distributing any of the profits. This computer run print-out is not attached to the study.

#### Basis n<sup>o</sup> 10 - Depreciation

Two (2) depreciation periods have been considered:

- For equipment and apparatus: ten (10) years.
- For the building itself: twenty (20) years.

Basis n<sup>o</sup>. 11 - Inflation Rates

The following inflation rates has been considered keeping in mind that all calculations have made in US dollars:

- Money inflation rate	3% per year
- Labour cost inflation rate	5% per year
- Raw material cost inflation rate	5% per year
- Maintenance and repair cost inflation rate	3% per year
- Utility costs inflation rate	3% per year
- Sale price inflation rate	4% per year
- Other costs inflation rate (see Basis n <sup>o</sup> 7)	5% per year
- Laboratory consumables inflation rate	5% per year
- Subcontracted services inflation rate	5% per year

Definitions of the terms used in the computer runs and their values are given at the beginning of Article II-9 - Financial Evaluation.

Basis n<sup>o</sup>. 12 - Utilities Cost

Utility prices vary widely from one country to another. Because of the portuguese offer to host the Centre, the utility prices in this country have been considered. They are the following:

Electric power	:	0,1 US \$/Kwh
Water supply	:	0,76 US \$/m <sup>3</sup>
Fuel-oil	:	0,75 US \$/kg
Fuel-gas	:	0,50 US \$/kg
Nitrogen	:	0,30 US \$/kg

Basis n<sup>o</sup>. 13- Investment Costs

Material and construction prices have been considered as if the ITPT Centre were to be built in Portugal since construction prices vary widely. Should the definite Host Country be other than Portugal, the investment cost evaluation must be adjusted, and therefore, the financial evaluation.

Basis n<sup>o</sup>. 14 - Marketing, Maintenance, Insurance and Overhead Cost

The following values have been assumed, based on consultant's own data.

Marketing	:	3% of total income
Maintenance	:	3% of total investment
Insurance	:	0.5% of fixed investment
Overhead	:	5% of total salaries cost

**II-6 INVESTMENT COSTS**

The schedules III-I-A/B and C summarize the concepts and procedures utilized and they are self-explanatory. Where additional information or clarifications have been considered necessary or convenient, they have been so stated in foot-notes or in the tables. The schedules have been prepared for each alternative when so required. Prices have been calculated consistent with Basis 13.

**Important notes**

- 1) Except as otherwise specified all figures are in US dollars.
- 2) Local expenses have been evaluated and converted to US dollars.
- 3) All figures are in thousands of US dollars (unless otherwise indicated).
- 4) The equipment and laboratory cost estimate has been made based on quotations obtained by the consultant.
- 5) As stated in Basis n<sup>o</sup> 1 the fee for the loan has not been considered because it has been assumed to be covered in each alternative by a donation of the Host Country. The interest charge of the small loan to cover operating deficits in the first years of operation have not been accounted for as this small loan is only a suggested possibility to cover initial deficits.

Tables are following:

SCHEDULE III - 1 - A

ESTIMATE OF INVESTMENT COST													VALUES IN THOUSAND US\$ (1000 \$)	
PROJECT PRE-IMPLEMENTATION CAPITAL EXPENDITURES														
Nº	Item Description	BASE CASE			ALT. 1			ALT. 2			ALT. 3			
		Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	
1	Pre-investment studies	124	—	124	60	—	60	60	—	60	60	—	60	
2	Preparatory investigations (Soil report, etc.)	—	4	4	—	4	4	—	4	4	—	4	4	
3	Management of project implementation	123	—	123	86	—	86	86	—	86	86	—	86	
4	Engineering, detailed design and procurement	444	—	444	311	—	311	311	—	311	311	—	311	
5	Construction supervision, co-ordination, test-runs and take over of civil works, equipment and plant	680	—	680	540	—	540	540	—	540	540	—	540	
6	Build-up of administration, recruitment and training of staff and labour	—	46	46	—	19	19	—	19	19	—	34	34	
7	Loan fee	247	—	247	138	—	138	115	—	115	163	—	163	
8	Arrangements for supplies	9	—	9	9	—	9	9	—	9	9	—	9	
9	Arrangements for marketing	5	—	5	5	—	5	5	—	5	5	—	5	
10	Build-up of connections	—	14	14	—	10	10	—	10	10	—	10	10	
11	Preliminary and capital issue expenditure	—	—	0	—	—	0	—	—	0	—	—	0	
	<b>TOTAL</b>	<b>1.385</b>	<b>64</b>	<b>1.449</b>	<b>1.011</b>	<b>33</b>	<b>1.044</b>	<b>1.011</b>	<b>33</b>	<b>1.044</b>	<b>1.011</b>	<b>48</b>	<b>1.059</b>	



## SCHEDULE III - 1 - B

ESTIMATE OF INVESTMENT COST													VALUES IN THOUSAND US \$ (1000 US\$)		
FIXED INVESTMENT COST															
NO	Item Description	BASE CASE			ALT. 1			ALT. 2			ALT. 3				
		Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total		
	<u>LAND</u>														
1	Land, Taxes, Legal expenses, Payment to neighbours, Rights of way, etc.	—	0	0	—	0	0	—	0	0	—	0	0		
	<u>CIVIL</u>														
2	Site preparation and development	—	23	23	—	20	20	—	20	20	—	20	20		
3	Building and civil works	—	3.144	3.144	—	2.354	2.354	—	1.715	1.715	—	1.831	1.831		
4	Auxiliary and Service Facilities	—	349	349	—	300	300	—	300	300	—	300	300		
	<u>EQUIPMENT</u>														
5	Chemistry Laboratory	566	243	809	412	176	588	412	176	588	566	243	809		
6	Microbiology Laboratory	209	89	298	171	74	245	171	74	245	209	89	298		
7	Pharmacology and animal breeding	298	128	426	286	123	409	286	123	409	298	128	426		
8	Instruments room	411	176	587	—	—	—	—	—	—	411	176	587		
9	Formulation & Packaging pilot plant	806	346	1.152	47	20	67	47	20	67	806	346	1.152		
10	Pilot plants & utilities	1.016	435	1.451	818	350	1.168	496	212	708	—	—	—		
11	Furniture	80	726	808	58	524	582	45	407	452	50	446	496		
12	Primary stock of spare parts and tools	384	165	549	215	92	307	176	76	252	193	83	276		
13	Air conditioning	110	439	549	80	319	399	61	243	304	64	256	320		
14	Miscellaneous	225	75	300	120	30	150	120	30	150	120	30	150		
15	Erection	26	500	526	13	238	251	13	173	186	13	145	158		
	<b>TOTAL</b>	<b>4.131</b>	<b>6.840</b>	<b>10.971</b>	<b>2.220</b>	<b>4.620</b>	<b>6.840</b>	<b>1.867</b>	<b>3.569</b>	<b>5.396</b>	<b>2.730</b>	<b>4.093</b>	<b>6.823</b>		

SCHEDULE III - 1 - C

SUMMARY SHEET - TOTAL INITIAL INVESTMENT COST				VALUES IN THOUSANDS US \$ (1000 US\$)									
No	Item Description	BASE CASE			ALT. 1			ALT. 2			ALT. 3		
		Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
1	Initial fixed investment cost	4.131	6.840	10.971	2.220	4.620	6.840	1.827	3.569	5.396	2.730	4.093	6.823
2	Pre-production capital expenditures	1.385	64	1.449	1.011	33	1.044	1.011	33	1.044	1.011	48	1.059
3	Working capital (at full capacity) in year 5	-	4.271	4.271	-	1.348	1.348		1.240	1.240	-	3.195	3.195
	<b>TOTAL</b>	<b>5.516</b>	<b>11.175</b>	<b>16.691</b>	<b>3.231</b>	<b>6.001</b>	<b>9.232</b>	<b>2.838</b>	<b>4.842</b>	<b>7.680</b>	<b>3.741</b>	<b>7.336</b>	<b>11.077</b>

### II-7 FINANCING COSTS

Financing Costs are shown on an annual basis in the computer runs for each case evaluated, lines 14 to 18, and therefore, they are omitted in this section to avoid repetition.

### II-8 OPERATING COSTS AND WORKING CAPITAL

The items which constitute the operating costs have been summarized for each alternative in the following schedules III-2-A and B. The rent for the land or building has been assumed to be a symbolic 1 US\$ per year, based on the suggestion stated in Volume III, Chapter I. "Institutional Status" and in the normal practice for this type of institutions. Due to its irrelevant value, it has not been included in the computer calculations.

The same "important notes", stated in Article II-6 of this chapter, apply hereto.

Working capital requirements have been calculated considering the minimum days of coverage or turnover coefficients indicated in point 8.b of the Terms of Reference (as applicable to this Centre). The computer programme performs the calculations and only states the results. Therefore to facilitate the reading of the evaluations, the procedure and definition utilized have been summarized in schedule III-2-B. The Net Working Capital definition appearing in paragraph II-9-A, page III-35, shows what the computer uses for this concept.

Schedules are following:

## SCHEDULE III-2-A

SUMMARY SHEET - ESTIMATE OF INDUSTRIAL COST				VALUE IN THOUSANDS US\$ (1000 US \$)									
No	Item Description	BASE CASE			ALT. 1			ALT. 2			ALT. 3		
		Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
1	<u>RAW MATERIALS</u>	417	625	1.042	196	294	490	204	306	510	288	432	720
2	<u>SUBCONTRACTED SERVICES</u>												
	. Cleaning	-	7	7	-	7	7	-	7	7	-	7	7
	. Connection to computer network	-	80	80	-	80	80	-	80	80	-	80	80
	. Catering	-	8	8	-	8	8	-	8	8	-	8	8
	. Consulting (exter.)	60	-	60	60	-	60	60	-	60	60	-	60
	. Security and cafeteria services	-	180	180	-	140	140	-	140	140	-	150	150
	<u>SUB-TOTAL</u>	60	275	335	60	235	295	60	235	295	60	245	305
3	<u>LABORATORY CONSUMABLE MATERIAL</u>	52	208	260	20	80	100	20	80	100	20	80	210

Totals appear escalated in the computer print-out as "Raw Material", in correspondence with the production capacity assumed for each year. The values in this table correspond to the 100% capacity in the beginning of 1.986.

SCEDULE III-2 - A (Cont.)

SUMMARY SHEET - ESTIMATE OF INDUSTRIAL COST													VALUE IN THOUSAND US\$ (1000 US\$)		
No	Item Description	BASE CASE			ALT. 1			ALT. 2			ALT. 3				
		Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total		
4	<u>UTILITY COSTS</u>														
	. LIGHTING	---	34	34	---	20	20	---	20	20	---	20	20		
	. POWER	---	96	96	---	47	47	---	47	47	---	57	57		
	. FUEL	---	20	20	---	10	10	---	10	10	---	12	12		
	. WATER	---	36	36	---	18	18	---	18	18	---	21	21		
	. GAS	---	7	7	---	3	3	---	3	3	---	4	4		
	. NITROGEN	---	4	4	---	2	2	---	2	2	---	3	3		
	SUB-TOTAL	---	197	197	---	100	100	---	100	100	---	117	117		
5	<u>OTHER COSTS</u>														
	. Visits to centre for least developed countries	17	17	34	10	10	20	10	10	20	15	15	30		
	. Training for least developed countries	17	17	34	10	10	20	10	10	20	15	15	30		
	. Suscriptions to technical papers	40	5	45	24	3	27	24	3	27	37	4	41		
	. Telex	---	95	95	---	57	57	---	57	57	---	87	87		
	. Telephone	---	160	160	---	96	96	---	96	96	---	146	146		
	. Office consumables	---	50	50	---	30	30	---	30	30	---	46	46		
	SUB-TOTAL	74	344	418	44	206	250	44	206	250	67	313	380		

Totals appear escalated in the computer print-out as " Utilities ", in correspondence with the production capacity assumed for each year. The values in this table correspond to the 100% capacity in the beginning of 1.986.

SCHEDULE III-2 - A (Cont.)

SUMMARY SHEET - ESTIMATE OF INDUSTRIAL COST													VALUE IN THOUSAND US\$ (1000 US\$)		
No	Item Description	BASE CASE			ALT. 1			ALT. 2			ALT. 3				
		Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total		
6	<u>SALARIES COSTS</u>														
	. A DIRECTORS	146	--	146	146	--	146	146	--	146	146	--	146		
	. B TECHNICAL STAFF	--	1,164	1,164	--	472	472	--	472	472	--	991	991		
	. C AUXILIARY STAFF	--	467	467	--	197	197	--	197	197	--	254	254		
	SUB-TOTAL	146	1,631	1,777	146	669	815	146	669	815	146	1,245	1,391		
7	<u>TRAVEL COSTS (Cat.D)</u>	190	82	272	70	30	100	70	30	100	147	63	210		
8	<u>OVERHEAD COSTS</u>	--	102	102	--	46	46	--	46	46	--	80	80		
9	<u>INSURANCE COSTS</u>	--	62	62	--	39	39	--	32	32	--	40	40		
10	<u>MAINTENANCE AND REPAIR COSTS</u>	--	373	373	--	237	237	--	193	193	--	236	236		
11	<u>SALES &amp; MARKETING COSTS</u>	123	123	246	15	15	30	15	15	30	93	93	186		
12	<u>RENT FOR USE OF FACILITIES</u>			*		*	*			*			*		

NOTES: \* Not added in totals nor stated. Amounts 1 US \$ (See Basis no 1)

Projected industrial costs are shown in the computer run print-outs, and have been omitted here to avoid repetition.

The values in this table correspond to 100 % capacity in the beginning of 1986.

SCHEDULE III-2-BWORKING CAPITAL DEFINITION

ITEM	CATEGORY	COVERAGE
	<b>I. <u>CURRENT ASSETS</u></b>	
1	Accounts receivable	3 months
2	Raw materials	3 months
3	Work in Progress (Production costs)	2 months
4	Finished Products	0 months
5	Cash in hand (Production costs - Raw materials - Utilities cost - Depreciation)	2 months
6	Total Current Assets	-x-
	<b>II. <u>CURRENT LABILITIES</u></b>	
7	Accounts payable (of Raw materials)	1 month
	<b>III. <u>WORKING CAPITAL</u></b>	
8	(Current assets - Current liabilities)	-x-

## II-9 FINANCIAL EVALUATION

Before going on to the calculations, we present below in summarized form a listing of the various parameters and a brief description of how the programme works.

### A. Profitability Analysis Programme ("PROAF")

The financial analysis is performed by means of a specific computer programme named "PROFITABILITY ANALYSIS PROGRAM "PROAF." The mathematical model of this programme is based on "DISCOUNT CASH FLOW -D.C.F." techniques.

The programme uses the following input parameters:

- a) Project schedule
  - Design and construction dates
  - Start-up date
- b) Span of the study
- c) Production programme
- d) Total investment
- e) Raw material costs
- f) Utility costs
- g) Working capital
- h) Financing conditions
- i) Escalation rates
- j) Amortization period
- k) Sales prices
- l) Corporate tax
- m) Inflation costs
- n) Maintenance costs
- o) Insurance cost
- p) Marketing cost
- q) Labour costs
- r) Social charges
- s) Overheads

The summarized output provided by the programme includes the parameters listed and defined as follows:



Total Products Income	: $\sum (\text{Product Quantity}) \times (\text{Product Prices})$ .
Total Raw Materials Cost	: $\sum (\text{Raw Material Consumption}) \times (\text{Raw Material Prices}) + (\text{Subcontracted Services}) + \sum (\text{Laboratory Consumables})$ .
Operating Margin	: $(\text{Total Product Income}) - (\text{Total Raw Material Cost})$ .
Total Utility Cost	: $(\text{Utility Consumption}) \times (\text{Utilities prices}) + (\text{Other Costs})$ .
Labour Cost	: $\sum (\text{Labour Quantity}) \times (\text{Salaries}) + (\text{Travel Expenses})$ .
Company Overheads	: $\sum \text{Cost of the Centre's Overheads}$ .
Maintenance, Insurance and Marketing cost.	: $\sum (\text{Cost of Maintenance and Repair of the Centre}) + \sum (\text{Insurance Cost}) + \sum (\text{Marketing Cost})$ .
Industrial Cost	: $(\text{Total Utilities Cost}) + (\text{Total Labor Cost}) + (\text{Company Overheads}) + (\text{Maintenance, Insurance and Marketing Cost})$ .
Industrial Margin	: $(\text{Operating Margin}) - (\text{Industrial Cost})$ .
Depreciation	: $(\text{Total Investment}) / (\text{Depreciation Period})$
Amortization of Loan	: Annual Financing Amortization.
Production cost	: $(\text{Total Raw Materials Cost}) + (\text{Industrial Cost}) + (\text{Depreciation Cost}) + (\text{Interest Cost})$ .
Interest Cost	: Annual Interests Cost of the Financing.
Gross Profit	: $(\text{Total Sales}) - (\text{Production Costs})$ .
Corporate Tax	: Tax on the above Gross Profit
Net Working Capital	: $(\text{Accounts receivable for 3 months}) + (\text{Utility Cost for 2 months}) + (\text{Work in progress for 4 months}) + (\text{Depreciation cost for 2 months})$

Cash Flow	: (Industrial Margin) - (Amortization of Loan). - (Financing Interest Cost). - (Corporate Taxes).
Discount Factor	: $(1/(1+r)^n$ ; n= year number
Accumulated Cash Flow Present Value	: $\sum$ Cash Flow x Discount Factor
Ratio (R)	: Accumulated Cash Flow Present Value/Total Investment
Rate of Return on Total Investment	: r, value that makes R=1
Devaluation Rate	: i
Discount Factor at Devaluation Rate	: $1/(1+i)^n$
Accumulated Cash Flow Present Value at Devaluation Rate	: Cash Flow x Discount Factor at Devaluation Rate.
Payout Time	: Year Number that makes the Accumulated Cash Flow Present Value at Devaluation Rate equal to Own Investment.

The programme has the possibility to perform a sensitivity analysis to highlight the incidence of variations of various input data on the profitability of the project. The sensitivity analysis has been performed, and is shown at the end of this Article.

B. Values of the Parameters of the Study in the PROAF

<u>Description</u>	<u>Value</u>	<u>Input Limitations Unit and Conditions</u>
Construction Period	2	Year. A project of 18 months will be expressed as 18/12 = 1.5 years.
Financing percentage	1	-- Expressed as the fraction to one of the total investment cost.
Financing amortization period.	10	Year. Expressed in years
Financing interest	0.07	-- Expressed as the fraction to one, annual.
Money inflation rate	0.03	-- Expressed as the fraction to one, annual.

Currency fluctuation	0	--	Expressed as the fraction to one, annual.
Maintenance and repair	0.03	--	Expressed as the fraction to one, over investment.
Insurance cost	0.005	--	Expressed as the fraction to one, over investment.
Escalation for maintenance and insurance	0.03	--	Expressed as the fraction to one, annual.
Marketing cost	0.03	--	Expressed as the fraction to one, over product income.
Corporate Taxes	0	--	Expressed as the fraction to one.
Labour Category A	1	--	-
Labour Category B -	1	--	-
Labour Category C	1	--	-
Labour Category D	1	--	-
Category A-Salaries	see sch 4	\$x10 <sup>3</sup>	Expressed as total money for all the people in this category.
Category B-Salaries	see sch 4	\$x10 <sup>3</sup>	Expressed as total money for all the people in this category.
Category C-Salaries	see sch 4	\$x10 <sup>3</sup>	Expressed as total money for all the people in this category.
Category D-Salaries (Travel expenses)	see sch 4	\$x10 <sup>3</sup>	Expressed as total money for all the people in this category.
Salary escalation (all categories)	0.05	--	Expressed as the fraction to one, annual.
Company overheads	0.05	--	Expressed as the fraction to one, over salary cost
Other costs escalation	0.05	--	Expressed as the fraction to one, over other costs
Utility escalation	0.03	--	Expressed as the fraction to one, over utilities
Sales escalation	0.04	--	Expressed as the fraction to one, annual.
Raw material escalation	0.05	--	Expressed as the fraction to one, annual.
Depreciation rates	-	-	Expressed as the fraction of investment cost to depreciation period.

Production Factor for all the evaluations:

Year	1	:	0.50
Year	2	:	0.65
Year	3	:	0.80
Year	4	:	0.95
Year	5 to 10	:	1

IMPORTANT NOTES:

- 1) In the computer runs, computer year no. 1 is 1986 corresponding to start-up and initial operation of the plant at 50% capacity.
- 2) To conform with computer mathematical model amortizations of all loans have been calculated as commencing also in year 1989.
- 3) All figures appear escalated in the computer run. The escalation rates have been stated in the Basis for the Financial Evaluation. In the tables utilized in the former articles, all prices refer to 1983. Therefore, there is no inconsistency between the figures in the computer runs (which appear escalated one year) and those in the tables.
- 4) It has been assumed that the initial investment loan when applicable, has been granted in year minus two (-2), i.e. beginning in 1985.
- 5) Loan interest for the years 1984 - 1985 have been included in the interest charge in year 1986. This approach (made to simplify presentation of the computer run) penalizes the financial results of the first year of operation.

C. Computerized Evaluations Description

A brief description follows of the evaluations made common to all alternatives. In all cases it has been considered that production starts in year 1, which is 1986 and that the construction of the facilities will be completed during 1984-1985. The computer runs (consisting of two (2) sheets each) appears in Exhibit III-1 of this Volume. Each print-out has been identified with an "E", and the sequence number of the corresponding evaluation and the alternate studied, i.e. A1, E-2 is the print out of evaluation n<sup>o</sup>. 2. for Alternate n<sup>o</sup>.1.

Evaluation n<sup>o</sup>. 1

Values for all variables	:	Most likely values
Prices considered	:	Current prices
Depreciation rates	:	Building 20 years. Equipment 10 years
Loan terms and conditions	:	Interest rate: 7%. Maturity period: 15 years (see notes in paragraph C)
Print-out identification	:	E-1

In the following evaluations all values for the parameters are the same as for Evaluation n<sup>o</sup>.1 except as mentioned herebelow.

Evaluation n<sup>o</sup>.2

Varied parameters : 10% increase in sales revenues  
 Print-out identification : E-2

Evaluation n<sup>o</sup>. 3

Varied parameters : 5% increase in sales revenues  
 Print-out identification : E-3

Evaluation n<sup>o</sup>. 4

Varied parameters : 5% decrease in sales revenues.  
 Print-out identification : E-4

Evaluation n<sup>o</sup>. 5

Varied parameters : 10% decrease in sales revenues.  
 Print-out identification: E-5

Evaluation n<sup>o</sup>. 6

Varied parameters : 10% increase in total investment.  
 Print-out identification: E-6

Evaluation n<sup>o</sup>. 7

Varied parameters : 10% decrease in total investment.  
 Print-out identification: E-7

Evaluation n<sup>o</sup>. 8

Varied parameters : 10% increase in salaries cost.  
 Print-out identification : E-8

Evaluation n<sup>o</sup>. 9

Varied parameters : 10% decrease in salaries cost.  
 Print-out identification : E-9

Evaluation n<sup>o</sup>. 10

Varied parameters : Loan interest: 4%  
 Print-out identification : E-10

Evaluation n<sup>o</sup>. 11

Varied parameters : -Loan interest: 10%  
 Print-out identification : E-11

**D. Summary and analysis of the evaluations**

The computer print-outs show all required data to prepare the balance sheets for the span of the evaluations. Therefore all conventional schedules, such as cash-flow, net income statement, sources of finance, total initial investment and projections, have been omitted to avoid duplication. The Balance Sheet (schedules III-3-A/B) and a summary of the evaluation results (sensitivity analysis) (schedule III-4) have been presented. The summary of evaluations is self-explanatory, and no additional comments are required.

SCHEDULE III - 3- ABALANCE SHEETBASE CASE

(All values are in thousand US \$)

	<u>1.986</u>	<u>1.987</u>	<u>1.988</u>	<u>1.989</u>	<u>1.990</u>	<u>1.991</u>	<u>1.992</u>	<u>1.993</u>	<u>1.994</u>	<u>1.995</u>
<b><u>ASSETS</u></b>										
Cash	907.-	646.-	675.-	708.-	727.-	743.-	759.-	777.-	794.-	811.-
Accounts Receivables	1.068.-	1.444.-	1.848.-	2.282.-	2.498.-	2.598.-	2.702.-	2.810.-	2.923.-	3.040.-
Raw Materials	215.-	293.-	379.-	473.-	522.-	548.-	576.-	605.-	635.-	667.-
Work in Progress	1.282.-	1.092.-	1.200.-	1.316.-	1.379.-	1.418.-	1.459.-	1.501.-	1.546.-	1.592.-
<b>TOTAL CURRENT ASSETS</b>	<b>3.472.-</b>	<b>3.475.-</b>	<b>4.102.-</b>	<b>4.779.-</b>	<b>5.126.-</b>	<b>5.307.-</b>	<b>5.496.-</b>	<b>5.693.-</b>	<b>5.898.-</b>	<b>6.110.-</b>
Building & Equipment	11.354	10.288.-	9.221.-	8.155.-	7.089.-	6.023.-	4.957.-	3.890.-	2.824.-	1.758.-
<b>TOTAL FIXED ASSETS</b>	<b>11.354.-</b>	<b>10.288.-</b>	<b>9.221.-</b>	<b>8.155.-</b>	<b>7.089.-</b>	<b>6.023.-</b>	<b>4.957.-</b>	<b>3.890.-</b>	<b>2.824.-</b>	<b>1.758.-</b>
<b>TOTAL ASSETS</b>	<b>14.826.-</b>	<b>13.763.-</b>	<b>13.323.-</b>	<b>12.934.-</b>	<b>12.215.-</b>	<b>11.330.-</b>	<b>10.453.-</b>	<b>9.583.-</b>	<b>8.722.-</b>	<b>7.868.-</b>
<b><u>Liability &amp; Equity</u></b>										
<b><u>Current Liabilities</u></b>	<b>72.-</b>	<b>98.-</b>	<b>126.-</b>	<b>158.-</b>	<b>174.-</b>	<b>183.-</b>	<b>192.-</b>	<b>202.-</b>	<b>212.-</b>	<b>222.-</b>
Bank Loans	12.420.-	12.420.-	12.420.-	11.521.-	10.559.-	9.530.-	8.429.-	7.251.-	5.890.-	4.546.-
Additional Loan	5.752.-	5.439.-	4.778.-	4.024.-	2.531.-	791.-	-.-	-.-	-.-	-.-
Retained Profits	-3.418.-	-4.194.-	-4.001.-	-2.769.-	-1.049.-	836.-	1.832.-	2.130.-	2.620.-	3.100.-
<b>TOTAL LIABILITIES AND EQUITY.</b>	<b>14.826.-</b>	<b>13.763.-</b>	<b>13.323.-</b>	<b>12.934.-</b>	<b>12.215.-</b>	<b>11.330.-</b>	<b>10.453.-</b>	<b>9.583.-</b>	<b>8.722.-</b>	<b>7.868.-</b>

NOTE: This figures represent differences between "Accumulated profits" in the computer runs and "Retained Profits" in this Balance Sheet and are monies which are available to reduce sale prices from the seventh (7th) year of operation and onwards or to pay for services and visits to the Centre for the least developed countries.

SCHEDULE III-3-BBALANCE SHEETALTERNATE 3

(All values are in thousand US \$)

	<u>1.986</u>	<u>1.987</u>	<u>1.988</u>	<u>1.989</u>	<u>1.990</u>	<u>1.991</u>	<u>1.992</u>	<u>1.993</u>	<u>1.994</u>	<u>1.995</u>
<u>ASSETS</u>										
Cash	634	472	495	519	533	548	563	578	593	608
Accounts Receivables	809	1.094	1.400	1.729	1.893	1.969	2.048	2.129	2.215	2.303
Raw Materials	162	221	286	357	394	414	434	456	479	503
Work in Progress	898	791	874	964	1.014	1.045	1.078	1.113	1.149	1.187
<b>TOTAL CURRENT ASSETS</b>	<b>2.503</b>	<b>2.578</b>	<b>3.055</b>	<b>3.569</b>	<b>3.834</b>	<b>3.976</b>	<b>4.123</b>	<b>4.276</b>	<b>4.436</b>	<b>4.601</b>
Building & Equipment	7.201	6.521	5.840	5.159	4.479	3.798	3.117	2.437	1.756	1.076
<b>TOTAL FIXED ASSETS</b>	<b>7.201</b>	<b>6.521</b>	<b>5.840</b>	<b>5.159</b>	<b>4.479</b>	<b>3.798</b>	<b>3.117</b>	<b>2.437</b>	<b>1.756</b>	<b>1.076</b>
<b>TOTAL ASSETS</b>	<b>9.704</b>	<b>9.099</b>	<b>8.895</b>	<b>8.728</b>	<b>8.313</b>	<b>7.774</b>	<b>7.240</b>	<b>6.713</b>	<b>6.192</b>	<b>5.677</b>
<u>Liability &amp; Equity</u>										
Current Liabilities	54	74	94	119	131	138	145	152	160	168
Bank Loans	7.882	7.882	7.882	7.312	6.701	6.048	5.349	4.601	3.801	2.885
Additional Loan	3.922	3.669	3.089	2.334	1.028	---	---	---	---	---
Retained Profits	-2.154	-2.526	-2.171	-1.037	453	1.588	1.746	1.960	2.231	2.624
<b>TOTAL LIABILITIES AND EQUITY</b>	<b>9.704</b>	<b>9.099</b>	<b>8.895</b>	<b>8.728</b>	<b>8.313</b>	<b>7,774</b>	<b>7.240</b>	<b>6.713</b>	<b>6.192</b>	<b>5.677</b>

NOTE: This figures represent differences between "Accumulated profits in the computer runs and "Retained Profits" in this Balance Sheet and are monies which are available to reduce sale price from the six (6th) year of operation and onwards or to pay for services and visits to the Centre for the least developed countries.

**SCHEDULE III-4**  
**SUMMARY OF FINANCIAL EVALUATIONS - SENSITIVITY ANALYSIS**

EVALUATION NO	PARAMETER	TREND OF THE PARAMETER	% VALUE	BASE A		BASE B		ALT-1		ALT-2		ALT-3	
				R.R.	P.B.	R.R.	P.B.	R.R.	P.B.	R.R.	P.B.	R.R.	P.B.
1	Base Case	---	---	0,8	4	42,6	2	---	>11	---	>11	5,4	4
2	Sales	High	+10%	8,6	3	54,5	1	---	>11	---	>11	13,4	3
3	Sales	High	+5%	4,8	4	48,6	2	---	>11	---	>11	9,6	3
4	Sales	Low	-5%	---	5	36,4	2	---	>11	---	>11	0,4	4
5	Sales	Low	-10%	---	7	30	2	---	>11	---	>11	---	6
6	Investment	High	+10%	---	5	38,8	2	---	>11	---	>11	2,2	4
7	Investment	Low	-10%	4,2	4	51,4	2	---	>11	---	>11	8,8	3
8	Salaries	High	+10%	---	5	38,8	2	---	>11	---	>11	2,6	4
9	Salaries	Low	-10%	3	4	46,6	2	---	>11	---	>11	7,8	3
10	Loan Interest	Low	4%	4,2	3	45,8	1	---	>11	---	>11	8,6	3
11	Loan interest	High	10%	---	6	39,8	2	---	>11	---	>11	2	5

R.R. = Rate of Return on total investment

P.B. = Pay-back period (years)

--- = Rate of return less than 0,2%



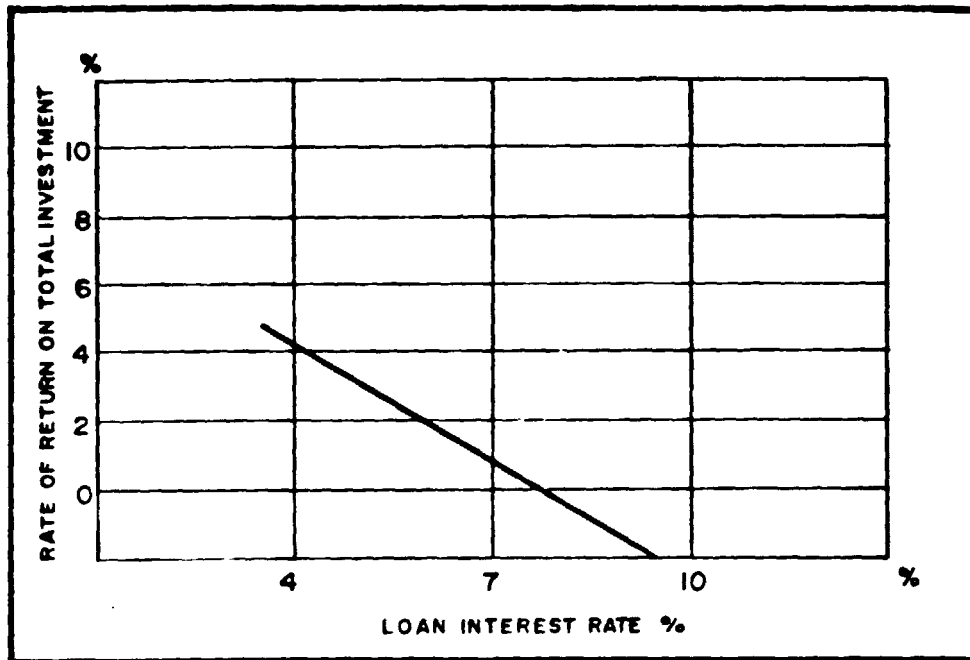
### E. Sensitivity analysis

The mathematical calculations required to perform the sensitivity analysis have been made utilizing the computer programme and summarized in schedule III-4. The results can be visualized in Charts nº. III-1-A/B and III-2-A/B, which show what happens to the rate of return on total investment when variations occur in the most important factors (salary and investment cost, sales value and loan interest rate) that may affect the profitability of the project, for both the Base Case A and Alternate 3.

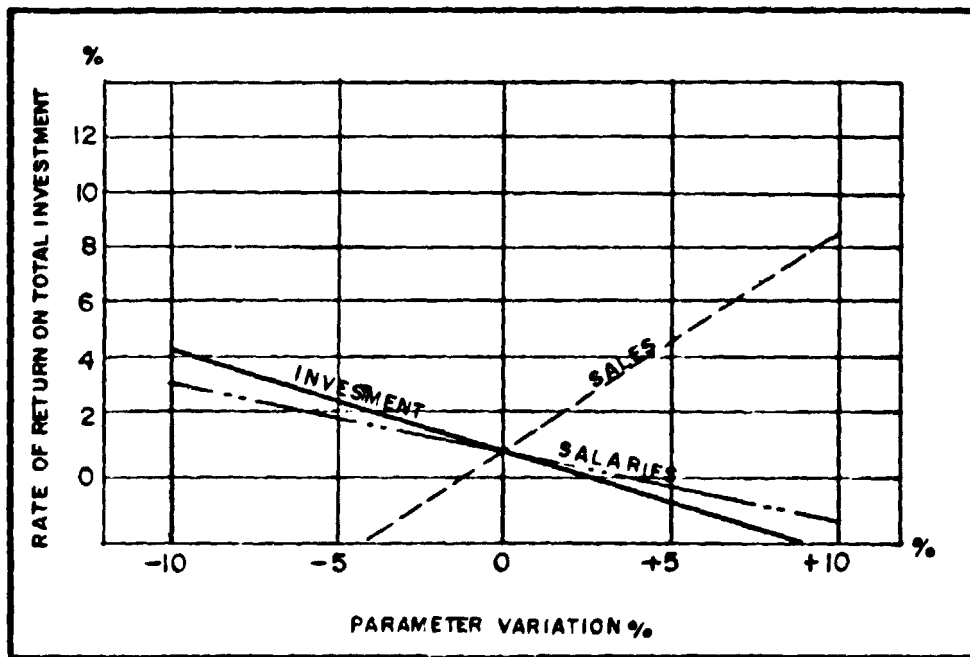
A brief comment follows about the results of the sensitivity analysis.

- 1) Considering the most likely values for all variables, the Base Case B, and Alternate A-3, have normal profitability. Base Case A shows lower profitability than the others. However considering the non-profit character of the centre it may be also considered viable as it will become economically self sufficient between the fifth and sixth year.
- 2) If sales value increases, Base Case A, B and Alternate A-3 present normal to high profitability and the Centre becomes self-sufficient before the third year of operation.
- 3) If sales value decreases, only the Base Case B remains profitable. However Base Case A and Alternate 3 could still be considered, due to the non-profit character of the centre, as they become economically self-sufficient between the third and fifth year. A similar situation occurs when the salary cost and investment cost vary, but the project is less sensitive to these factors than to the variation in sales value.
- 4) If the loan interest rate is different than the average assumed (7%), the Base Case A, B and Alternate 3 remain feasible either because they have normal to high profitability (low interest rate) or because with lower profitabilities, they soon become self-sufficient (between the second and third year), bearing in mind the non-profit character of the centre.

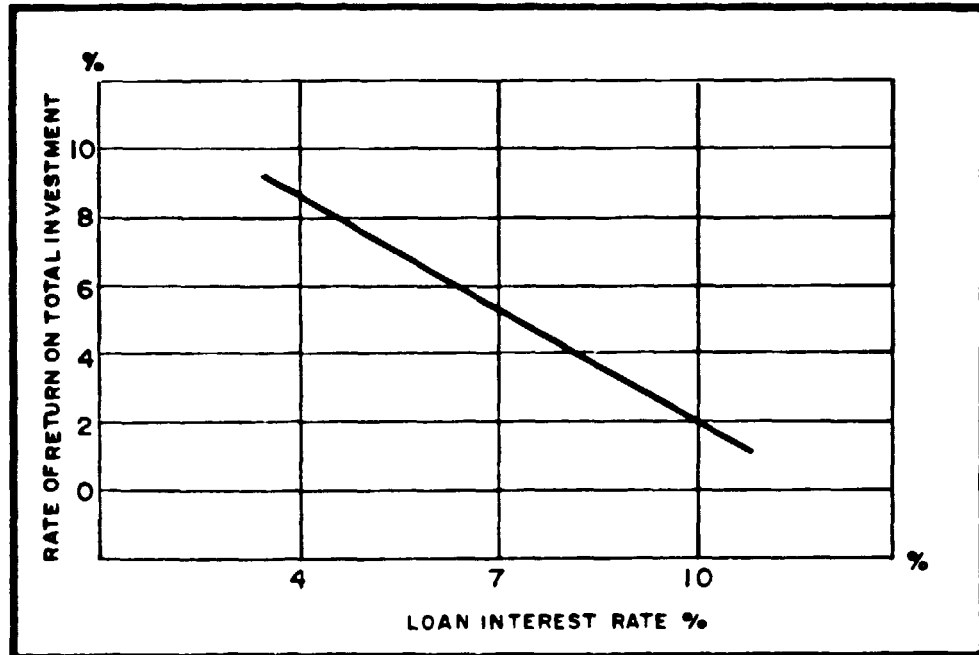
Finally, a graphical determination of the break-even point has been made and visualized in chart III-3-A and B for Base Case A and Alternate 3.



**CHART-III-1-A**  
**SENSITIVITY ANALYSIS TO LOAN INTEREST RATE**  
**BASE CASE A**

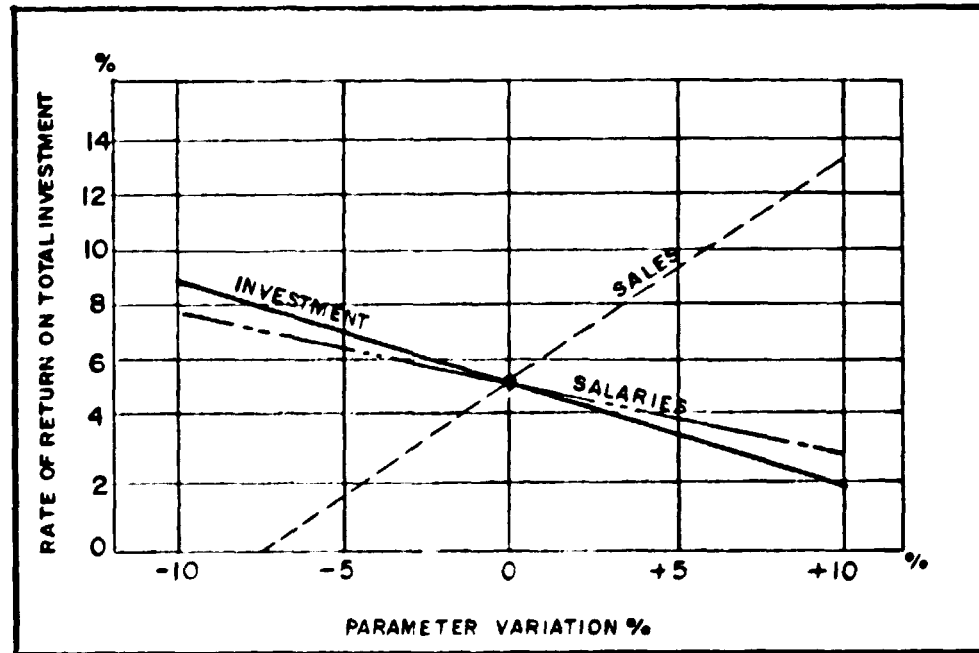


**CHART-III-2-A**  
**SENSITIVITY ANALYSIS TO SALES, SALARIES AND INVESTMENT**  
**BASE CASE A**



**CHART- III - 1 - B**  
**SENSITIVITY ANALYSIS TO LOAN INTEREST RATE**

**Alt. - 3**



**CHART- III - 2 - B**  
**SENSITIVITY ANALYSIS TO SALES, SALARIES AND INVESTMENT**

**Alt. - 3**

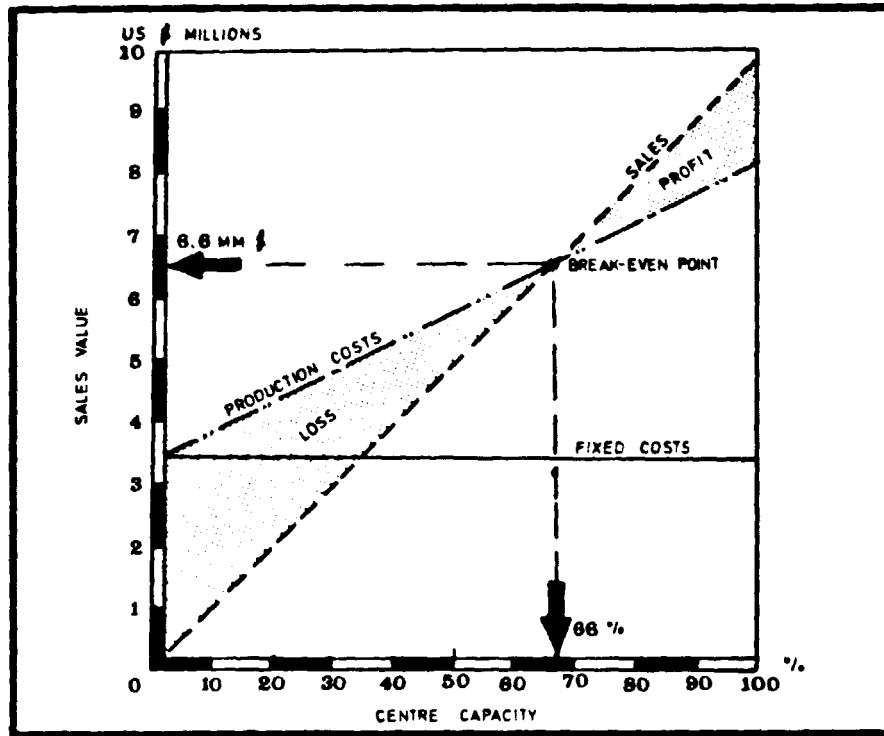


CHART-III-3-A  
BREAK EVEN POINT (BASE CASE A)

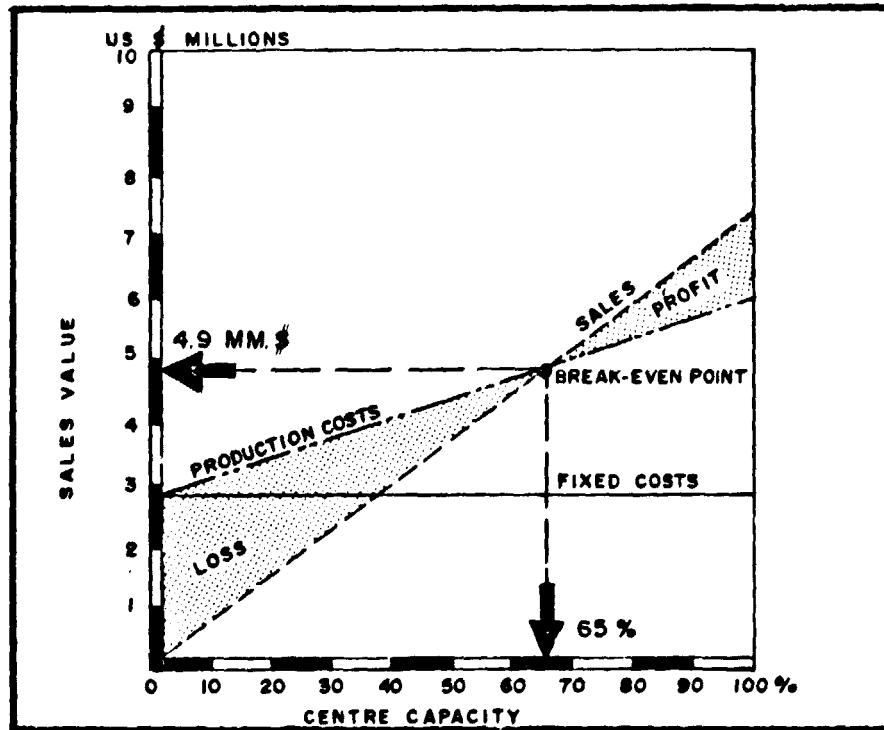
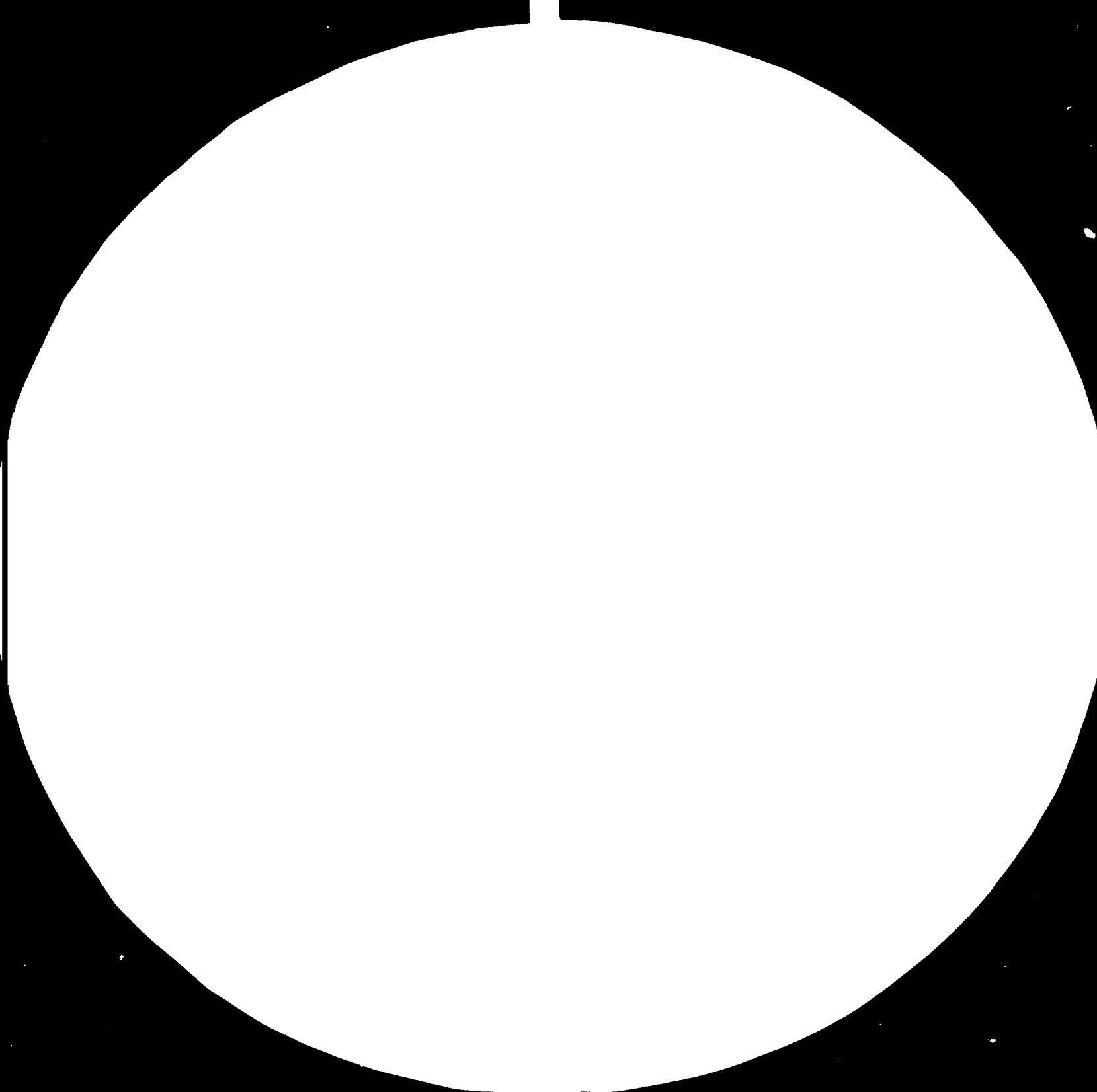


CHART-III-3-B  
BREAK-EVEN POINT (Alt.-3)





4



3.2



3.6



## MICROCOPY RESOLUTION TEST CHART

NATIONAL BUREAU OF STANDARDS  
STANDARD REFERENCE MATERIAL 1010a  
(ANSI and ISO TEST CHART No. 2)

II-10 CONCLUSIONS OF THE FINANCIAL EVALUATION

1. The evaluations show that a phased implementation of the project in various centres is not feasible if it is intended to fulfil all the objectives and activities. Therefore, Alternates 1 and 2 will no longer be considered any more in these conclusions.
- 2) If the centre is implemented as an integral multipurpose unit (Base Case A and B), or if only formulation and packaging research, training, information and quality control activities are to be performed (Alternate 3), the evaluations show that the centre is feasible and reasonably sensitive to variations in labour and investment cost.
- 3 The project is sensitive to variations in the sales value. Therefore a strong marketing effort must be made in the first three years of operation to achieve the sales volume forecast.
4. With loan interest rates of 4%, 7% and 10%, the rate of return on total investment varies from 4.2% to 13.2%. The interest rates considered are reasonable because of the objectives and character of the ITPT Centre, the suggested financing sources objectives and characteristics (official banking institutions dedicated to finance development projects for developing countries), and the fact that all financing charges are being repaid when calculating the rate of return in this project, and no own investment capital has been considered.
5. The break-even point (66%) of total capacity is slightly high. However, it occurs between the second and third year of operation in all evaluations. This is due to the significant economic load imposed by the labour cost. This is quite acceptable for this project in view of its characteristics, provided that the marketing effort required during the first three years is done, as mentioned in conclusion nº. 3. After this period, there will be an increasing accumulation of undistributed profit (as shown in the Balance Sheet) that could be used to lower sales prices to member countries, and to provide free services to some least developed countries.
- 6 The rate of return does not change with variations of inflation rate. This is normal because the effect of inflation is to vary the business volume, and therefore to improve or impair the cash flows. Therefore, these evaluations have not been included.
7. Except for those evaluations testing reductions in sales volume, the cash generated by the project is adequate to repay the loan, to allow medium term expansion and even to give some services free of cost to the least developed countries.

In general, it can be concluded that in addition to the considerations regarding the valuable social benefits and those resulting in the economics of health care for the developing countries, the ITPT Centre, (defined as Base Case or Alternate 3) is economically feasible and can become self-sufficient in the short to medium term. It justifies, therefore, the efforts that UNIDO and the future member countries and others devote towards its implementation.

**II-11 RECOMMENDATION**

In view of the foregoing it is recommended that the ITPT Centre be established, and that the funds for its construction be obtained from donations from member countries, governments or Foundations and that the difference required to cover the initial investment needs, be obtained from official banking institutions.

This recommendation is based in that the Centre be established as defined in the Base Case (multipurpose integrated facility) or as defined in Alternate 3 (formulation and packaging research, quality control, information, training and engineering and advisory services). This Alternate 3 should be expanded in the future to incorporate the synthetic and medicinal plant derived drugs pilot plants, and to arrive to the multipurpose integrated facility necessary to achieve all objectives pursued.



EXHIBIT III-1

COMPUTER RUNS FOR FINANCIAL ANALYSIS

BASE CASE "A"

EVALUATION - 1

We assume:

- Most likely values
- Current prices

Results:

- Rates of return on  
total investment ..... 0,8%
- Pay-back period ..... 4 year

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2664.50
3. OPERATING MARGIN (1+2)	3411.85	4601.64	5875.68	7238.46	7904.31	8199.59	8505.64	8822.83	9151.56	9492.23
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-224.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.89	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-63.96	-65.88	-67.86	-69.89	-71.99	-74.15	-76.38	-78.67	-81.03	-83.46
8. MAINTENANCE-REPAIR COST	-383.78	-395.29	-407.15	-419.36	-431.95	-444.90	-458.25	-472.00	-486.16	-500.74
9. MARKETING COST	-128.14	-173.24	-221.75	-273.86	-299.81	-311.80	-324.27	-337.24	-350.73	-364.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-3155.81	-3441.79	-3746.66	-4071.54	-4311.46	-4509.39	-4716.66	-4933.71	-5161.02	-5399.08
11. INDUSTRIAL MARGIN (3+10)	256.05	1159.87	2129.03	3166.92	3592.85	3690.20	3788.98	3889.12	3990.54	4093.15
12. DEPRECIATION COST-A (EQUIPMENT)	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40
13. DEPRECIATION COST-B (BUILDINGS)	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	12420.00	12420.00	12420.00	12420.00	11521.07	10559.22	9530.03	8428.81	7250.50	5989.70
15. INTEREST COST	2608.20	869.40	869.40	869.40	806.47	739.15	667.10	590.02	507.53	419.28
16. AMORTIZATION FEE				1768.33	1768.33	1768.33	1768.33	1768.33	1768.33	1768.33
17. AMORTIZATION OF LOAN				898.93	961.85	1029.18	1101.23	1178.31	1260.79	1349.05
18. ACUMULATED AMORTIZATION OF LOAN				898.93	1860.78	2889.97	3991.19	5169.50	6430.30	7779.35
19. PRODUCTION COSTS (2+10+12+13-15)	-7689.63	-6550.50	-7198.28	-7897.43	-8273.41	-8508.47	-8753.38	-9008.52	-9274.28	-9551.06
20. GROSS PROFIT (1+19)	-3418.35	-775.73	193.43	1231.32	1720.18	1884.86	2055.68	2232.91	2416.81	2607.67
21. CORPORATE TAX										
22. NET PROFIT	-3418.35	-775.73	193.43	1231.32	1720.18	1884.86	2055.68	2232.91	2416.81	2607.67

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	256.05	1159.87	2129.03	3166.92	3592.85	3600.20	3788.98	3889.12	3990.54	4093.15
INTEREST COST (15)	2608.20	869.40	869.40	869.40	806.47	739.15	667.10	590.02	507.53	419.28
AMORTIZATION OF LOAN (17)				898.93	961.85	1029.18	1101.23	1178.31	1260.79	1349.05
WORKING CAPITAL	3399.85	3376.93	3976.43	4621.41	4951.52	5124.23	5303.95	5490.98	5685.58	5888.06
B. CASH FLOW (11-15-17)	-2352.15	290.47	1259.63	1398.60	1824.52	1921.87	2020.65	2120.79	2222.21	2324.82
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2283.64	273.79	1152.74	1242.63	1573.85	1609.54	1642.98	1674.17	1703.14	1729.88
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2283.64	-2009.85	-857.11	385.52	1959.37	3568.91	5211.89	6884.06	8589.20	10319.09
F. PAY OUT TIME	4.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4271.28	5774.77	7391.71	9128.74	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
PRODUCTION COSTS (19)	-7689.63	-6550.50	-7198.28	-7897.43	-8273.41	-8508.47	-8753.38	-9008.52	-9274.28	-9551.06
GROSS PROFIT (20)	-3418.35	-775.73	193.43	1231.32	1720.18	1884.86	2055.68	2232.91	2416.81	2607.67
CORPORATE TAX (21)										
NET PROFIT (22)	-3418.35	-775.73	193.43	1231.32	1720.18	1884.86	2055.68	2232.91	2416.81	2607.67
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3418.35	-775.73	193.43	1231.32	1720.18	1884.86	2055.68	2232.91	2416.81	2607.67
ACUMULATED UNDISTRICTED PROFITS	-3418.35	-4194.08	-4000.66	-2769.33	-1049.16	835.70	2891.38	5124.28	7541.09	10148.76
TOTAL INVESTMENT	12420.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.80									

BASE CASE "A"

EVALUATION - 2

We assume:

- All variables as in Evaluation 1.
- 10% increase in sales

Results:

- Rates of return on  
total investment ..... 8,6 %
- Pay-back period ..... 3 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	4698.20	6351.97	8130.52	10041.19	10992.46	11432.16	11889.44	12365.02	12859.62	13374.01
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3838.77	5178.85	6614.49	8150.89	8903.19	9238.42	9586.02	9946.43	10320.10	10707.51
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.52	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-63.96	-65.88	-67.86	-69.89	-71.99	-74.15	-76.38	-78.67	-81.03	-83.46
8. MAINTENANCE-REPAIR COST	-383.78	-395.29	-407.15	-419.36	-431.95	-444.90	-458.25	-472.00	-486.16	-500.74
9. MARKETING COST	-140.95	-190.56	-243.92	-301.24	-329.77	-342.96	-356.68	-370.95	-385.79	-401.22
10. INDUSTRIAL COST (4+5+6+7+8+9)	-3168.61	-3459.10	-3768.82	-4098.91	-4341.43	-4540.56	-4749.07	-4967.42	-5196.07	-5435.54
11. INDUSTRIAL MARGIN (3+10)	670.16	1719.75	2845.67	4051.98	4561.76	4697.86	4836.95	4979.01	5124.02	5271.97
12. DEPRECIATION COST-A (EQUIPMENT)	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40
13. DEPRECIATION COST-B (BUILDINGS)	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	12420.00	12420.00	12420.00	12420.00	11521.07	10559.22	9530.03	8428.81	7250.50	5989.70
15. INTEREST COST	2608.20	869.40	869.40	869.40	806.47	739.15	667.10	590.62	507.53	419.28
16. AMORTIZATION FEE				1768.33	1768.33	1768.33	1768.33	1768.33	1768.33	1768.33
17. AMORTIZATION OF LOAN				898.93	961.85	1029.18	1101.23	1178.31	1260.79	1349.05
18. ACUMULATED AMORTIZATION OF LOAN				898.93	1860.78	2889.97	3991.19	5169.50	6430.30	7779.35
19. PRODUCTION COSTS (2+10+12+13-15)	-7702.44	-6567.82	-7220.45	-7924.81	-8303.38	-8539.64	-8785.79	-9042.23	-9309.33	-9587.52
20. GROSS PROFIT (1+19)	-3004.24	-215.85	910.07	2116.38	2689.08	2892.52	3103.65	3322.79	3550.29	3786.49
21. CORPORATE TAX										
22. NET PROFIT	-3004.24	-215.85	910.07	2116.38	2689.08	2892.52	3103.65	3322.79	3550.29	3786.49

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER INFRIA</b>										
<b>CASH FLOW TABLES</b>										
*****										
INDUSTRIAL MARGIN (11)	670.16	1719.75	2845.67	4051.98	4561.76	4697.86	4836.95	4979.01	5124.02	5271.97
INTEREST COST (15)	2408.20	869.40	869.40	869.40	806.47	739.15	667.10	590.02	507.53	419.28
AMORTIZATION OF LOAN (17)				898.93	961.85	1029.18	1101.23	1178.31	1260.79	1349.05
A. WORKING CAPITAL	3510.85	3527.00	4148.52	4858.65	5211.23	5394.32	5584.85	5783.11	5989.40	6204.04
B. CASH FLOW (11-15-17)	-1938.04	850.35	1976.27	2283.65	2793.43	2929.54	3068.62	3210.68	3355.70	3503.64
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-1881.59	801.53	1808.57	2029.00	2409.64	2453.44	2495.07	2534.54	2571.86	2607.04
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-1881.59	-1080.06	728.51	2757.51	5167.14	7620.58	10115.66	12650.20	15222.06	17829.10
F. PAY OUT TIME	3.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4498.20	6351.97	8130.52	10041.19	10992.46	11432.16	11889.44	12365.02	12859.62	13374.01
PRODUCTION COSTS (19)	-7702.44	-6567.82	-7220.45	-7924.81	-8303.38	-8539.64	-8785.79	-9042.23	-9309.33	-9587.52
GROSS PROFIT (20)	-3004.24	-215.85	910.07	2116.38	2689.08	2892.52	3103.65	3322.79	3550.29	3786.49
CORPORATE TAX (21)										
NET PROFIT (22)	-3004.24	-215.85	910.07	2116.38	2689.08	2892.52	3103.65	3322.79	3550.29	3786.49
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3004.24	-215.85	910.07	2116.38	2689.08	2892.52	3103.65	3322.79	3550.29	3786.49
ACUMULATED UNDISTRIBUTED PROFITS	-3004.24	-3220.09	-2310.02	-193.64	2495.44	5387.96	8491.61	11814.41	15364.69	19151.19
TOTAL INVESTMENT	12420.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	8.60									

BASE CASE "A"

EVALUATION - 3

We assume:

- All variables as in Evaluation 1.
- 5% increase in sales.

Results:

- Rates of return on  
total investment ..... 4,8%
- Pay-back period ..... 4 years



	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	4485.00	6063.72	7761.56	9585.53	10493.63	10913.38	11349.91	11803.91	12276.06	12767.11
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3625.57	4890.60	6245.54	7695.23	8404.36	8719.64	9046.49	9385.31	9736.54	10100.61
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-751.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-63.96	-65.88	-67.86	-69.89	-71.99	-74.15	-76.38	-78.67	-81.03	-83.46
8. MAINTENANCE-REPAIR COST	-383.78	-395.29	-407.15	-419.36	-431.95	-444.90	-458.25	-472.00	-486.16	-500.74
9. MARKETING COST	-134.55	-181.91	-232.85	-287.57	-314.81	-327.40	-340.50	-354.12	-368.28	-383.01
10. INDUSTRIAL COST (4+5+6+7+8+9)	-3162.22	-3450.46	-3757.75	-4085.24	-4326.46	-4524.99	-4732.88	-4950.58	-5178.57	-5417.33
11. INDUSTRIAL MARGIN (3+10)	463.36	1440.15	2487.78	3609.99	4077.89	4194.65	4313.61	4434.73	4557.97	4683.28
12. DEPRECIATION COST-A (EQUIPMENT)	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40
13. DEPRECIATION COST-B (BUILDINGS)	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	12420.00	12420.00	12420.00	12420.00	11521.07	10559.22	9530.03	8428.81	7250.50	5989.70
15. INTEREST COST	2608.20	869.40	869.40	869.40	806.47	739.15	667.10	590.02	507.53	419.28
16. AMORTIZATION FEE				1768.33	1768.33	1768.33	1768.33	1768.33	1768.33	1768.33
17. AMORTIZATION OF LOAN				898.93	961.85	1029.18	1101.23	1178.31	1260.79	1349.05
18. ACUMULATED AMORTIZATION OF LOAN				898.93	1860.78	2889.97	3991.19	5169.50	6430.30	7779.35
19. PRODUCTION COSTS (2+10+12+13-15)	-7696.04	-6559.17	-7209.38	-7911.14	-8288.41	-8524.07	-8769.61	-9025.39	-9291.83	-9569.31
20. GROSS PROFIT (1+19)	-3211.04	-495.45	552.18	1674.39	2205.22	2389.30	2580.30	2778.51	2984.24	3197.80
21. CORPORATE TAX										
22. NET PROFIT	-3211.04	-495.45	552.18	1674.39	2205.22	2389.30	2580.30	2778.51	2984.24	3197.80

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
INDUSTRIAL MARGIN (11)	463.36	1440.15	2487.78	3609.99	4077.89	4194.65	4313.61	4434.73	4557.97	4683.28
INTEREST COST (15)	2608.20	869.40	869.40	869.40	806.47	739.15	667.10	590.02	507.53	419.28
AMORTIZATION OF LOAN (17)				898.93	961.85	1029.18	1101.23	1178.31	1260.79	1349.05
A. WORKING CAPITAL	3455.41	3452.05	4072.60	4740.17	5081.53	5259.44	5444.57	5637.22	5837.68	6046.24
B. CASH FLOW (11-15-17)	-2144.84	570.75	1618.38	1841.66	2309.57	2426.32	2545.28	2666.40	2789.64	2914.95
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2082.37	537.99	1481.05	1636.29	1992.25	2032.00	2069.54	2104.88	2138.03	2169.00
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2082.37	-1544.39	-63.34	1572.96	3565.21	5597.21	7666.76	9771.64	11909.67	14078.66
F. PAY OUT TIME	4.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4485.00	6063.72	7761.56	9585.53	10493.63	10913.38	11349.91	11803.91	12276.06	12767.11
PRODUCTION COSTS (19)	-7696.04	-6559.17	-7209.38	-7911.14	-8288.41	-8524.07	-8769.61	-9025.39	-9291.83	-9569.31
GROSS PROFIT (20)	-3211.04	-495.45	552.18	1674.39	2205.22	2389.30	2580.30	2778.51	2984.24	3197.80
CORPORATE TAX (21)										
NET PROFIT (22)	-3211.04	-495.45	552.18	1674.39	2205.22	2389.30	2580.30	2778.51	2984.24	3197.80
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3211.04	-495.45	552.18	1674.39	2205.22	2389.30	2580.30	2778.51	2984.24	3197.80
ACUMULATED UNDISTRICTED PROFITS	-3211.04	-3706.49	-3154.31	-1479.92	725.30	3114.60	5694.91	8473.42	11457.66	14655.46
TOTAL INVESTMENT	12420.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	4.80									

BASE CASE "A"

EVALUATION - 4

We assume:

- All variables as in Evaluation 1.
- 5% decrease in sales

Results:

- Rates of return on  
total investment ..... -x-
- Pay-back period ..... 5 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>-----</b>										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
<b>*****</b>										
1. TOTAL SALES	4057.54	5485.82	7021.85	8671.99	9493.54	9873.28	10268.22	10678.94	11106.10	11550.35
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3198.13	4312.71	5505.83	6781.69	7404.27	7679.55	7964.79	8260.35	8566.58	8883.85
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-63.96	-65.88	-67.86	-69.89	-71.99	-74.15	-76.38	-78.67	-81.03	-83.46
8. MAINTENANCE-REPAIR COST	-383.78	-395.29	-407.15	-419.36	-431.95	-444.90	-458.25	-472.00	-486.16	-500.74
9. MARKETING COST	-121.73	-164.57	-210.66	-260.16	-284.81	-296.20	-308.05	-320.37	-333.18	-346.51
10. INDUSTRIAL COST (4+5+6+7+8+9)	-3149.40	-3433.12	-3735.56	-4057.84	-4296.46	-4493.79	-4700.43	-4916.83	-5143.47	-5380.83
11. INDUSTRIAL MARGIN (3+10)	48.74	879.59	1770.27	2723.86	3107.81	3185.76	3264.36	3343.51	3423.11	3503.02
12. DEPRECIATION COST-A (EQUIPMENT)	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40
13. DEPRECIATION COST-B (BUILDINGS)	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	12420.00	12420.00	12420.00	12420.00	11521.07	10559.22	9530.03	8428.81	7250.50	5989.70
15. INTEREST COST	2608.20	869.40	869.40	869.40	806.47	739.15	667.10	590.02	507.53	419.28
16. AMORTIZATION FEE				1768.33	1768.33	1768.33	1768.33	1768.33	1768.33	1768.33
17. AMORTIZATION OF LOAN				898.93	961.85	1029.18	1101.23	1178.31	1260.79	1349.05
18. ACUMULATED AMORTIZATION OF LOAN				898.93	1860.78	2889.97	3991.19	5169.50	6430.30	7779.35
19. PRODUCTION COSTS (2+10+12+13-15)	-7483.22	-6541.83	-7187.19	-7883.73	-8258.41	-8492.87	-8737.16	-8991.65	-9256.73	-9532.81
20. GROSS PROFIT (1+19)	-3625.66	-1056.01	-165.33	788.26	1235.13	1380.41	1531.06	1687.30	1849.37	2017.54
21. CORPORATE TAX										
22. NET PROFIT	-3625.66	-1056.01	-165.33	788.26	1235.13	1380.41	1531.06	1687.30	1949.37	2017.54

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER TRERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	48.74	879.59	1770.27	2723.86	3107.81	3185.76	3264.36	3343.51	3423.11	3503.02
INTEREST COST (15)	2608.20	869.40	869.40	869.40	806.47	739.15	667.10	590.02	507.53	419.28
AMORTIZATION OF LOAN (17)				898.93	961.85	1029.18	1101.23	1178.31	1260.79	1349.05
A. WORKING CAPITAL	3344.28	3301.80	3880.27	4502.65	4821.51	4989.01	5163.33	5344.73	5533.49	5729.88
B. CASH FLOW (11-15-17)	-2559.46	10.19	900.87	955.53	1339.48	1417.43	1496.03	1575.19	1654.78	1734.69
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2484.91	9.60	824.42	848.97	1155.45	1187.07	1216.41	1243.47	1268.25	1290.77
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2484.91	-2475.31	-1650.89	-801.92	353.53	1540.60	2757.01	4000.48	5268.73	6559.51
F. PAY OUT TIME	5.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4057.56	5485.82	7021.85	8671.99	9493.54	9873.28	10268.22	10678.94	11104.10	11550.35
PRODUCTION COSTS (19)	-7683.22	-6541.83	-7187.19	-7883.73	-8258.41	-8492.87	-8737.16	-8991.65	-9256.73	-9532.81
GROSS PROFIT (20)	-3625.66	-1056.01	-165.33	788.26	1235.13	1380.41	1531.06	1687.30	1849.37	2017.54
CORPORATE TAX (21)										
NET PROFIT (22)	-3625.66	-1056.01	-165.33	788.26	1235.13	1380.41	1531.06	1687.30	1849.37	2017.54
DIVIDENDS ON EQUITY UNDISTRIBUTED PROFITS	-3625.66	-1056.01	-165.33	788.26	1235.13	1380.41	1531.06	1687.30	1849.37	2017.54
ACUMULATED UNDISTRICTED PROFITS	-3625.66	-4681.67	-4847.01	-4058.75	-2823.62	-1443.21	87.85	1775.15	3624.52	5642.07
TOTAL INVESTMENT	12420.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

BASE CASE "A"

EVALUATION - 5

We assume:

- All variables as in Evaluation 1.
- 10% decrease in sales

Results:

- Rates of return on  
total investment ..... -x-
- Pay-back period ..... 7 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER THERIA</b>										
*****										
<b>PRODUCTION COSTS AND NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	3844.36	5197.57	6652.90	8216.33	8994.71	9354.50	9728.68	10117.83	10522.54	10943.45
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	2984.93	4024.46	5136.87	6326.03	6905.44	7160.77	7425.26	7699.24	7983.02	8276.95
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-63.94	-65.88	-67.86	-69.89	-71.99	-74.15	-76.38	-78.67	-81.03	-83.46
8. MAINTENANCE-REPAIR COST	-383.78	-395.29	-407.15	-419.36	-431.95	-444.90	-458.25	-472.00	-486.16	-500.74
9. MARKETING COST	-115.33	-155.93	-199.59	-246.49	-269.84	-280.64	-291.86	-303.53	-315.68	-328.30
10. INDUSTRIAL COST (4+5+6+7+8+9)	-3143.00	-3424.47	-3724.49	-4044.17	-4281.50	-4478.23	-4684.25	-4900.00	-5125.96	-5362.62
11. INDUSTRIAL MARGIN (3+10)	-158.06	599.99	1412.38	2281.87	2673.95	2682.54	2741.01	2799.23	2857.06	2914.33
12. DEPRECIATION COST-A (EQUIPMENT)	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40
13. DEPRECIATION COST-B (BUILDINGS)	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	12420.00	12420.00	12420.00	12420.00	11521.07	10559.22	9530.03	8428.81	7250.50	5989.70
15. INTEREST COST	2608.20	869.40	869.40	869.40	806.47	739.15	667.10	590.02	507.53	419.28
16. AMORTIZATION FEE				1768.33	1768.33	1768.33	1768.33	1768.33	1768.33	1768.33
17. AMORTIZATION OF LOAN				898.93	961.85	1029.18	1101.23	1178.31	1260.79	1349.05
18. ACCUMULATED AMORTIZATION OF LOAN				898.93	1860.78	2889.97	3991.19	5169.50	6430.30	7779.35
19. PRODUCTION COSTS (2+10+12+13-15)	-7676.82	-6533.19	-7176.12	-7870.06	-8243.44	-8477.31	-8720.97	-8974.81	-9239.22	-9514.60
20. GROSS PROFIT (1+19)	-3832.46	-1335.61	-523.22	346.27	751.27	877.20	1007.71	1143.02	1283.32	1428.85
21. CORPORATE TAX										
22. NET PROFIT	-3832.46	-1335.61	-523.22	346.27	751.27	877.20	1007.71	1143.02	1283.32	1428.85

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER INERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARRIN (11)	-158.06	599.99	1412.38	2281.87	2623.95	2682.54	2741.01	2799.23	2857.06	2914.33
INTEREST COST (15)	2608.20	869.40	869.40	869.40	806.47	739.15	667.10	590.02	507.53	419.28
AMORTIZATION OF LOAN (17)				898.93	961.85	1029.18	1101.23	1178.31	1260.79	1349.05
A. WORKING CAPITAL	3288.85	3226.86	3784.34	4384.18	4691.82	4854.13	5023.05	5198.84	5381.76	5572.09
B. CASH FLOW (11-15-17)	-2766.26	-269.41	542.98	513.54	855.62	914.21	972.69	1030.91	1088.73	1146.00
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2685.69	-253.95	496.90	456.27	738.06	765.64	790.88	813.81	834.42	852.73
E. ACCUMULATED CASH FLOW AT DEVALUATION RATE	-2685.69	-2939.64	-2442.74	-1986.47	-1248.40	-482.77	308.12	1121.92	1956.34	2809.07
F. PAY OUT TIME	7.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	3844.36	5197.57	6652.90	8216.33	8994.71	9354.50	9728.68	10117.83	10522.54	10943.45
PRODUCTION COSTS (19)	-7676.82	-6533.19	-7176.12	-7870.06	-8243.44	-8477.31	-8720.97	-8974.81	-9239.22	-9514.60
GROSS PROFIT (20)	-3832.46	-1335.61	-523.22	346.27	751.27	877.20	1007.71	1143.02	1283.32	1428.85
CORPORATE TAX (21)										
NET PROFIT (22)	-3832.46	-1335.61	-523.22	346.27	751.27	877.20	1007.71	1143.02	1283.32	1428.85
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3832.46	-1335.61	-523.22	346.27	751.27	877.20	1007.71	1143.02	1283.32	1428.85
ACUMULATED UNDISTRICTED PROFITS	-3832.46	-5168.08	-5691.30	-5345.03	-4593.76	-3716.57	-2708.85	-1565.84	-282.51	1146.33
TOTAL INVESTMENT	12420.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									



BASE CASE "A"

EVALUATION - 6

We assume:

- All variables as in Evaluation 1.
- 10% increase in investment.

Results:

- Rates of return on  
total investment ..... -x-
- Pay-back period ..... 5 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1895.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3411.85	4601.66	5875.68	7238.46	7904.31	8199.59	8505.64	8822.83	9151.56	9492.23
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-70.36	-72.47	-74.64	-76.88	-79.19	-81.57	-84.01	-86.53	-89.13	-91.80
8. MAINTENANCE-REPAIR COST	-422.16	-434.82	-447.87	-461.30	-475.14	-489.39	-504.08	-519.20	-534.77	-550.82
9. MARKETING COST	-128.14	-173.24	-221.75	-273.86	-299.81	-311.80	-324.27	-337.24	-350.73	-364.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-3200.58	-3487.90	-3794.16	-4120.46	-4361.86	-4561.30	-4770.12	-4988.78	-5217.74	-5457.50
11. INDUSTRIAL MARGIN (3+10)	211.27	1113.75	2081.52	3118.00	3542.46	3638.30	3735.52	3834.06	3933.82	4034.73
12. DEPRECIATION COST-A (EQUIPMENT)	-979.40	-979.40	-979.40	-979.40	-979.40	-979.40	-979.40	-979.40	-979.40	-979.40
13. DEPRECIATION COST-B (BUILDINGS)	-193.40	-193.40	-193.40	-193.40	-193.40	-193.40	-193.40	-193.40	-193.40	-193.40
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	13662.00	13662.00	13662.00	13662.00	12673.18	11615.14	10483.04	9271.69	7975.55	6588.67
15. INTEREST COST	2869.02	956.34	956.34	956.34	887.12	813.06	733.81	649.02	558.29	461.21
16. AMORTIZATION FEE				1945.16	1945.16	1945.16	1945.16	1945.16	1945.16	1945.16
17. AMORTIZATION OF LOAN				988.82	1058.04	1132.10	1211.35	1296.14	1386.87	1483.95
18. ACCUMULATED AMORTIZATION OF LOAN				988.82	2046.86	3178.96	4390.31	5686.45	7073.33	8557.28
19. PRODUCTION COSTS (2+10+12+13-15)	-8101.83	-6790.16	-7439.32	-8139.90	-8511.05	-8740.89	-8980.16	-9229.19	-9488.35	-9758.00
20. GROSS PROFIT (1+19)	-3830.55	-1015.39	-47.62	988.86	1482.54	1652.44	1828.91	2012.24	2202.73	2400.72
21. CORPORATE TAX										
22. NET PROFIT	-3830.55	-1015.39	-47.62	988.86	1482.54	1652.44	1828.91	2012.24	2202.73	2400.72

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
*****										
INDUSTRIAL MARGIN (11)	211.27	1113.75	2081.52	3118.00	3542.46	3638.30	3735.52	3834.06	3933.82	4034.73
INTEREST COST (15)	2869.02	956.34	956.34	956.34	887.12	813.06	733.81	649.02	558.29	461.21
AMORTIZATION OF LOAN (17)				988.82	1058.04	1132.10	1211.35	1296.14	1386.87	1483.95
A. WORKING CAPITAL	3519.48	3439.05	4039.01	4684.47	5012.97	5183.93	5361.78	5546.76	5739.17	5939.28
B. CASH FLOW (11-15-17)	-2657.75	157.41	1125.18	1172.84	1597.30	1693.14	1790.36	1888.89	1988.66	2089.57
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2580.34	148.37	1029.70	1042.05	1377.84	1417.97	1455.73	1491.11	1524.14	1554.83
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2580.34	-2431.96	-1402.26	-360.21	1017.63	2435.61	3891.33	5382.44	6906.59	8461.42
F. PAY OUT TIME	5.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
PRODUCTION COSTS (19)	-8101.83	-6790.16	-7439.32	-8139.90	-8511.05	-8740.89	-8980.16	-9229.19	-9488.35	-9758.00
GROSS PROFIT (20)	-3830.55	-1015.39	-47.62	988.86	1482.54	1652.44	1828.91	2012.24	2202.73	2400.72
CORPORATE TAX (21)										
NET PROFIT (22)	-3830.55	-1015.39	-47.62	988.86	1482.54	1652.44	1828.91	2012.24	2202.73	2400.72
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3830.55	-1015.39	-47.62	988.86	1482.54	1652.44	1828.91	2012.24	2202.73	2400.72
ACUMULATED UNDISTRICTED PROFITS	-3830.55	-4845.94	-4893.55	-3904.69	-2422.16	-769.72	1059.19	3071.42	5274.16	7674.88
TOTAL INVESTMENT	13662.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

BASE CASE "A"

EVALUATION - 7

We assume:

- All variables as in Evaluation 1.
- 10% decrease in investment.

Results:

- Rates of return on  
total investment ..... 4,2%
- Pay-back period ..... 4 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>-----</b>										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
<b>*****</b>										
1. TOTAL SALES	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3411.85	4601.66	5875.68	7238.46	7904.31	8199.59	8505.64	8822.83	9151.56	9492.23
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.37	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-57.57	-59.29	-61.07	-62.90	-64.79	-66.74	-68.74	-70.80	-72.92	-75.11
8. MAINTENANCE-REPAIR COST	-345.40	-355.76	-366.44	-377.43	-388.75	-400.41	-412.43	-424.80	-437.54	-450.67
9. MARKETING COST	-128.14	-173.24	-221.75	-273.86	-299.81	-311.80	-324.27	-337.24	-350.73	-364.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-3111.03	-3395.67	-3699.15	-4022.61	-4261.07	-4457.49	-4663.19	-4878.64	-5104.30	-5340.66
11. INDUSTRIAL MARGIN (3+10)	300.82	1205.99	2176.53	3215.85	3643.24	3742.11	3842.45	3944.19	4047.26	4151.57
12. DEPRECIATION COST-A (EQUIPMENT)	-801.40	-801.40	-801.40	-801.40	-801.40	-801.40	-801.40	-801.40	-801.40	-801.40
13. DEPRECIATION COST-B (BUILDINGS)	-158.20	-158.20	-158.20	-158.20	-158.20	-158.20	-158.20	-158.20	-158.20	-158.20
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	11178.00	11178.00	11178.00	11178.00	10368.96	9503.30	8577.03	7585.93	6525.45	5390.73
15. INTEREST COST	2347.38	782.46	782.46	782.46	725.83	665.23	600.39	531.01	456.78	377.35
16. AMORTIZATION FEE				1591.50	1591.50	1591.50	1591.50	1591.50	1591.50	1591.50
17. AMORTIZATION OF LOAN				809.04	865.67	926.27	991.10	1060.48	1134.71	1214.14
18. ACUMULATED AMORTIZATION OF LOAN				809.04	1674.70	2600.97	3592.07	4652.55	5787.27	7001.41
19. PRODUCTION COSTS (2+10+12+13-15)	-7277.44	-6310.85	-6957.24	-7654.97	-8035.77	-8276.05	-8526.61	-8787.85	-9060.21	-9344.11
20. GROSS PROFIT (1+19)	-3006.16	-536.07	434.47	1473.79	1957.82	2117.28	2282.45	2453.57	2630.88	2814.62
21. CORPORATE TAX										
22. NET PROFIT	-3006.16	-536.07	434.47	1473.79	1957.82	2117.28	2282.45	2453.57	2630.88	2814.62

	1	2	3	4	5	6	7	8	9	10
<b>FUSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	300.82	1205.99	2176.53	3215.85	3643.24	3742.11	3842.45	3944.19	4047.26	4151.57
INTEREST COST (15)	2347.38	782.46	782.46	782.46	725.83	665.23	600.39	531.01	456.78	377.35
AMORTIZATION OF LOAN (17)				809.04	865.67	926.27	991.10	1060.48	1134.71	1214.14
A. WORKING CAPITAL	3280.22	3314.81	3913.85	4558.36	4890.08	5064.52	5246.13	5435.19	5631.99	5834.85
B. CASH FLOW (11-15-17)	-2046.56	423.53	1394.07	1624.35	2051.75	2150.61	2250.95	2352.69	2455.76	2560.07
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-1986.95	399.21	1275.77	1443.22	1769.86	1801.10	1830.23	1857.24	1882.14	1904.93
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-1986.95	-1587.74	-311.97	1131.25	2901.11	4702.21	6532.44	8389.68	10271.81	12176.75
F. PAY OUT TIME	4.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
PRODUCTION COSTS (19)	-7277.44	-6310.85	-6957.24	-7654.97	-8035.77	-8276.05	-8526.61	-8787.05	-9060.21	-9344.11
GROSS PROFIT (20)	-3006.16	-536.07	434.47	1473.79	1957.82	2117.28	2282.45	2453.57	2630.88	2814.62
CORPORATE TAX (21)										
NET PROFIT (22)	-3006.16	-536.07	434.47	1473.79	1957.82	2117.28	2282.45	2453.57	2630.88	2814.62
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3006.16	-536.07	434.47	1473.79	1957.82	2117.28	2282.45	2453.57	2630.88	2814.62
ACUMULATED UNDISTRIBUTED PROFITS	-3006.16	-3542.23	-3107.77	-1633.98	323.84	2441.12	4723.57	7177.14	9808.02	12622.64
TOTAL INVESTMENT	11178.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	4.20									

BASE CASE "A"

EVALUATION - 8

We assume:

- All variables as in Evaluation 1.
- 10% increase in salaries.

Results:

- Rates of return on  
total investment ..... -x-
- Pay-back period ..... 5 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	4271.28	5774.77	7391.71	9128.74	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3411.85	4601.66	5875.68	7238.46	7904.31	8199.59	8505.64	8822.83	9151.56	9492.23
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-149.05	-177.50	-186.38	-195.70	-205.48	-215.76	-226.54	-237.87	-249.76	-262.25
CATEGORY-B	-1344.00	-1411.20	-1481.74	-1555.85	-1633.64	-1715.32	-1801.09	-1891.14	-1985.70	-2084.99
CATEGORY-C	-539.70	-566.68	-595.02	-624.77	-656.01	-688.81	-723.25	-759.41	-797.38	-837.25
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2338.35	-2455.27	-2578.03	-2706.93	-2842.28	-2984.39	-3133.61	-3290.29	-3454.81	-3627.55
6. OVERHEAD COST	-114.92	-122.76	-128.90	-135.35	-142.11	-149.22	-156.68	-164.51	-172.74	-181.38
7. INSURANCE COST	-63.96	-65.88	-67.86	-69.89	-71.99	-74.15	-76.38	-78.67	-81.03	-83.46
8. MAINTENANCE-REPAIR COST	-383.78	-395.29	-407.15	-419.34	-431.95	-444.90	-458.25	-472.00	-486.16	-500.74
9. MARKETING COST	-128.14	-173.24	-221.75	-273.84	-299.81	-311.80	-324.27	-337.24	-350.73	-364.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-3352.05	-3647.84	-3963.02	-4298.72	-4550.00	-4759.84	-4979.64	-5209.85	-5450.96	-5703.52
11. INDUSTRIAL MARGIN (3+10)	59.80	953.81	1912.67	2939.75	3354.31	3439.74	3526.00	3612.99	3700.60	3788.71
12. DEPRECIATION COST-A (EQUIPMENT)	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40
13. DEPRECIATION COST-B (BUILDINGS)	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	12420.00	12420.00	12420.00	12420.00	11521.07	10559.22	9530.03	8428.81	7250.50	5989.70
15. INTEREST COST	2608.20	869.40	869.40	869.40	806.47	739.15	667.10	590.02	507.53	419.28
16. AMORTIZATION FEE				1768.33	1768.33	1768.33	1768.33	1768.33	1768.33	1768.33
17. AMORTIZATION OF LOAN				898.93	961.85	1029.18	1101.23	1178.31	1260.79	1349.05
18. ACUMULATED AMORTIZATION OF LOAN				898.93	1860.78	2889.97	3991.19	5169.50	6430.30	7779.35
19. PRODUCTION COSTS (2+10+12+13-15)	-7885.88	-6756.56	-7414.64	-8124.61	-8511.95	-8758.94	-9016.37	-9284.66	-9564.22	-9855.50
20. GROSS PROFIT (1+19)	-3614.60	-981.79	-22.93	1004.15	1481.64	1634.39	1792.69	1954.77	2126.86	2303.23
21. CORPORATE TAX										
22. NET PROFIT	-3614.60	-981.79	-22.93	1004.15	1481.64	1634.39	1792.69	1954.77	2126.86	2303.23



	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	59.80	953.81	1912.67	2939.75	3354.31	3439.74	3526.00	3612.99	3700.60	3788.71
INTEREST COST (15)	2608.20	869.40	869.40	869.40	806.47	739.15	667.10	590.02	507.53	419.28
AMORTIZATION OF LOAN (17)				898.93	961.85	1029.18	1101.23	1178.31	1260.79	1349.05
A. WORKING CAPITAL	3465.26	3445.61	4048.55	4697.14	5031.04	5207.71	5391.61	5583.02	5782.23	5989.54
B. CASH FLOW (11-15-17)	-2548.40	84.41	1043.27	1171.42	1585.99	1671.41	1757.67	1844.66	1932.27	2020.38
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW DISCOUNT FACTOR (B * C)	-2474.17	79.57	954.74	1040.79	1368.09	1399.78	1429.14	1456.19	1480.92	1503.35
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2474.17	-2394.61	-1439.87	-399.08	969.00	2368.78	3797.93	5254.12	6735.04	8238.39
F. PAY OUT TIME	5.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
PRODUCTION COSTS (19)	-7885.88	-6756.56	-7414.64	-8124.61	-8511.95	-8758.94	-9016.37	-9284.66	-9564.22	-9855.50
GROSS PROFIT (20)	-3614.60	-981.79	-22.93	1004.15	1481.64	1634.39	1792.69	1956.77	2126.86	2303.23
CORPORATE TAX (21)										
NET PROFIT (22)	-3614.60	-981.79	-22.93	1004.15	1481.64	1634.39	1792.69	1956.77	2126.86	2303.23
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3614.60	-981.79	-22.93	1004.15	1481.64	1634.39	1792.69	1956.77	2126.86	2303.23
ACUMULATED UNDISTRICTED PROFITS	-3614.60	-4596.39	-4619.32	-3615.18	-2133.54	-499.14	1293.55	3250.32	5377.18	7680.41
TOTAL INVESTMENT	12420.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

BASE CASE "A"

EVALUATION - 9

We assume:

- All variables as in Evaluation 1.
- 10% decrease in salaries

Results:

- Rates of return on  
total investment ..... 3%
- Pay-back period ..... 4 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	4271.20	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3411.85	4601.66	5875.68	7238.46	7904.31	8199.59	8505.64	8822.83	9151.56	9492.23
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-137.55	-144.43	-151.65	-159.23	-167.19	-175.55	-184.33	-193.55	-203.22	-213.39
CATEGORY-B	-1100.40	-1155.42	-1213.19	-1273.85	-1337.54	-1404.42	-1474.64	-1548.37	-1625.79	-1707.08
CATEGORY-C	-441.00	-463.05	-486.20	-510.51	-536.04	-562.84	-590.98	-620.53	-651.56	-684.14
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-1964.55	-2062.78	-2165.92	-2274.21	-2387.92	-2507.32	-2632.68	-2764.32	-2902.54	-3047.66
6. OVERHEAD COST	-98.23	-103.14	-108.30	-113.71	-119.40	-125.37	-131.63	-138.22	-145.13	-152.38
7. INSURANCE COST	-63.96	-65.88	-67.86	-69.89	-71.99	-74.15	-76.38	-78.67	-81.03	-83.46
8. MAINTENANCE-REPAIR COST	-383.78	-395.29	-407.15	-419.36	-431.95	-444.90	-458.25	-472.00	-486.16	-500.74
9. MARKETING COST	-128.14	-173.24	-221.75	-273.86	-299.81	-311.80	-324.27	-337.24	-350.73	-364.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2959.56	-3235.73	-3530.30	-3844.36	-4072.93	-4258.93	-4453.67	-4657.57	-4871.07	-5094.64
11. INDUSTRIAL MARGIN (3+10)	452.29	1365.93	2345.39	3394.10	3831.39	3940.67	4051.97	4165.26	4280.48	4397.59
12. DEPRECIATION COST-A (EQUIPMENT)	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40
13. DEPRECIATION COST-B (BUILDINGS)	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	12420.00	12420.00	12420.00	12420.00	11521.07	10559.22	9530.03	8428.81	7250.50	5989.70
15. INTEREST COST	2608.20	869.40	869.40	869.40	806.47	739.15	667.10	590.02	507.53	419.28
16. AMORTIZATION FEE				1768.33	1768.33	1768.33	1768.33	1768.33	1768.33	1768.33
17. AMORTIZATION OF LOAN				898.93	961.85	1029.18	1101.23	1178.31	1260.79	1349.05
18. ACUMULATED AMORTIZATION OF LOAN				898.93	1860.78	2889.97	3991.19	5169.50	6430.30	7779.35
19. PRODUCTION COSTS (2+10+12+13-15)	-7493.39	-6344.45	-6981.92	-7670.26	-8034.87	-8258.01	-8490.40	-8732.38	-8984.33	-9246.62
20. GROSS PROFIT (1+19)	-3222.11	-569.67	409.79	1458.50	1958.71	2135.32	2318.67	2509.04	2706.75	2912.11
21. CORPORATE TAX										
22. NET PROFIT	-3222.11	-569.67	409.79	1458.50	1958.71	2135.32	2318.67	2509.04	2706.75	2912.11

	1	2	3
<b>FOSTER WHEELER IBERIA</b>			
<b>CASH FLOW TABLES</b>			
*****			
INDUSTRIAL MARGIN (11)	452.29	1365.93	2345.39
INTEREST COST (15)	2608.20	869.40	869.40
AMORTIZATION OF LOAN (17)			
A. WORKING CAPITAL	3334.43	3308.24	3904.31
B. CASH FLOW (11-15-17)	-2155.91	496.53	1475.99
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2093.11	468.02	1350.74
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2093.11	-1625.09	-274.36
F. PAY OUT TIME	4.00		
<b>NET INCOME STATEMENT</b>			
TOTAL SALES (1)	4271.28	5774.77	7391.71
PRODUCTION COSTS (19)	-7493.39	-6344.45	-6981.92
GROSS PROFIT (20)	-3222.11	-569.67	409.79
CORPORATE TAX (21)			
NET PROFIT (22)	-3222.11	-569.67	409.79
DIVIDENDS ON EQUITY			
UNDISTRIBUTED PROFITS	-3222.11	-569.67	409.79
ACUMULATED UNDISTRIATED PROFITS	-3222.11	-3791.78	-3382.00
TOTAL INVESTMENT	12420.00		
<b>RATIOS</b>			
RATE OF RETURN ON TOTAL INVESTMENT	3.00		

BASE A

4	5	6	7	8	9	10
3394.10	3831.39	3940.67	4051.97	4165.26	4280.48	4397.59
869.40	806.47	739.15	667.10	590.02	507.53	419.28
898.93	961.85	1029.18	1101.23	1178.31	1260.79	1349.05
4545.69	4872.01	5040.74	5216.29	5398.93	5588.93	5786.58
1625.77	2063.06	2172.34	2283.64	2396.93	2512.16	2629.26
0.89	0.86	0.84	0.81	0.79	0.77	0.74
1444.48	1779.61	1819.30	1856.81	1892.16	1925.36	1956.42
1170.12	2949.74	4769.04	6625.84	8518.00	10443.36	12399.78
9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
-7670.26	-8034.87	-8258.01	-8490.40	-8732.38	-8984.33	-9246.62
1458.50	1958.71	2135.32	2318.67	2509.04	2706.75	2912.11
1458.50	1958.71	2135.32	2318.67	2509.04	2706.75	2912.11
1458.50	1958.71	2135.32	2318.67	2509.04	2706.75	2912.11
-1923.49	35.22	2170.54	4489.21	6998.25	9705.00	12617.11

BASE CASE "A"

EVALUATION - 10

We assume:

- All variables as in Evaluation 1.
- Loan interest 4%.

Results:

- Rates of return on  
total investment ..... 4,2%
- Pay-back period ..... 3 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1514.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3411.85	4601.66	5875.68	7238.46	7904.31	8199.59	8505.64	8822.83	9151.56	9492.23
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-224.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2893.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-63.96	-65.88	-67.86	-69.89	-71.99	-74.15	-76.38	-78.67	-81.03	-83.46
8. MAINTENANCE-REPAIR COST	-383.78	-395.29	-407.15	-419.36	-431.95	-444.90	-458.25	-472.00	-486.16	-500.74
9. MARKETING COST	-128.14	-173.24	-221.75	-273.86	-299.81	-311.80	-324.27	-337.24	-350.73	-364.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-3155.81	-3441.79	-3746.66	-4071.54	-4311.46	-4509.39	-4716.66	-4933.71	-5161.02	-5399.08
11. INDUSTRIAL MARGIN (3+10)	256.05	1159.87	2129.03	3166.92	3592.85	3690.20	3788.98	3889.12	3990.54	4093.15
12. DEPRECIATION COST-A (EQUIPMENT)	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40
13. DEPRECIATION COST-B (BUILDINGS)	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	12420.00	12420.00	12420.00	12420.00	11385.53	10309.47	9190.79	8027.15	6816.96	5558.36
15. INTEREST COST	1490.40	496.80	496.80	496.80	455.42	412.39	367.63	321.09	272.68	222.33
16. AMORTIZATION FEE				1531.27	1531.27	1531.27	1531.27	1531.27	1531.27	1531.27
17. AMORTIZATION OF LOAN				1034.47	1075.85	1118.89	1163.64	1210.19	1258.60	1308.94
18. ACUMULATED AMORTIZATION OF LOAN				1034.47	2110.33	3229.21	4392.85	5603.04	6861.64	8170.58
19. PRODUCTION COSTS (2+10+12+13-15)	-6571.83	-6177.90	-6825.68	-7524.83	-7922.36	-8181.72	-8453.91	-8739.59	-9039.42	-9354.11
20. GROSS PROFIT (1+19)	-2300.55	-403.13	566.03	1603.92	2071.23	2211.62	2355.15	2501.84	2651.66	2804.61
21. CORPORATE TAX										
22. NET PROFIT	-2300.55	-403.13	566.03	1603.92	2071.23	2211.62	2355.15	2501.84	2651.66	2804.61

	1	2	3	4
<b>FOSTER WHEELER IBERIA</b>				
<b>CASH FLOW TABLES</b>				
*****				
INDUSTRIAL MARGIN (11)	256.05	1159.87	2129.03	3166.92
INTEREST COST (15)	1490.40	496.80	496.80	496.80
AMORTIZATION OF LOAN (17)				1034.47
A. WORKING CAPITAL	3027.25	3252.73	3852.23	4497.21
B. CASH FLOW (11-15-17)	-1234.35	663.07	1632.23	1635.65
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-1198.40	625.01	1493.72	1453.25
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-1198.40	-573.39	920.32	2373.58
F. PAY OUT TIME	3.00			
<b>NET INCOME STATEMENT</b>				
TOTAL SALES (1)	4271.28	5774.77	7391.71	9128.76
PRODUCTION COSTS (19)	-6571.83	-6177.90	-6825.68	-7524.83
GROSS PROFIT (20)	-2300.55	-403.13	566.03	1603.92
CORPORATE TAX (21)				
NET PROFIT (22)	-2300.55	-403.13	566.03	1603.92
DIVIDENDS ON EQUITY				
UNDISTRIBUTED PROFITS	-2300.55	-403.13	566.03	1603.92
ACUMULATED UNDISTRIBUTED PROFITS	-2300.55	-2703.68	-2137.66	-533.73
TOTAL INVESTMENT	12420.00			
<b>RATIOS</b>				
RATE OF RETURN ON TOTAL INVESTMENT	4.20			

BASE A EVALUATION



5	6	7	8	9	10
3592.85	3690.20	3788.98	3889.12	3990.54	4093.15
455.42	412.39	367.63	321.09	272.68	222.33
1075.85	1118.89	1163.64	1210.19	1258.60	1308.94
4834.51	5015.31	5204.13	5401.33	5607.30	5822.41
2061.58	2158.93	2257.71	2357.85	2459.27	2561.88
0.86	0.84	0.81	0.79	0.77	0.74
1778.34	1808.07	1835.72	1861.31	1884.82	1906.28
4151.91	5959.98	7795.70	9657.01	11541.84	13448.11
9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
-7922.36	-8181.72	-8453.91	-8739.59	-9039.42	-9354.11
2071.23	2211.62	2355.15	2501.84	2651.66	2804.61
2071.23	2211.62	2355.15	2501.84	2651.66	2804.61
2071.23	2211.62	2355.15	2501.84	2651.66	2804.61
1537.50	3749.11	6104.26	8604.10	11257.76	14062.38

BASE CASE "A"

EVALUATION - 11

We assume:

- All variables as in Evaluation 1.
- Loan interest 10%

Results:

- Rates of return on  
total investment ..... -x-
- Pay-back period ..... 6 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	4271.28	5774.77	7391.71	9128.74	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1514.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3411.85	4601.64	5875.68	7238.46	7904.31	8199.59	8505.64	8822.83	9151.56	9492.23
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-63.96	-65.88	-67.86	-69.89	-71.99	-74.15	-76.38	-78.67	-81.03	-83.46
8. MAINTENANCE-REPAIR COST	-383.78	-395.29	-407.15	-419.36	-431.95	-444.90	-458.25	-472.00	-486.16	-500.74
9. MARKETING COST	-128.14	-173.24	-221.75	-273.86	-299.81	-311.80	-324.27	-337.24	-350.73	-364.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-3155.81	-3441.79	-3746.66	-4071.54	-4311.46	-4509.39	-4716.66	-4933.71	-5161.02	-5399.08
11. INDUSTRIAL MARGIN (3+10)	256.05	1159.87	2129.03	3166.92	3592.85	3690.20	3788.98	3889.12	3990.54	4093.15
12. DEPRECIATION COST-A (EQUIPMENT)	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40	-890.40
13. DEPRECIATION COST-B (BUILDINGS)	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80	-175.80
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	12420.00	12420.00	12420.00	12420.00	11640.70	10783.47	9840.52	8803.28	7662.31	6407.24
15. INTEREST COST	3726.00	1242.00	1242.00	1242.00	1164.07	1078.35	984.05	880.33	766.23	640.72
16. AMORTIZATION FEE				2021.30	2021.30	2021.30	2021.30	2021.30	2021.30	2021.30
17. AMORTIZATION OF LOAN				779.30	857.23	942.95	1037.25	1140.97	1255.07	1380.57
18. ACUMULATED AMORTIZATION OF LOAN				779.30	1636.53	2579.48	3616.72	4757.69	6012.76	7393.33
19. PRODUCTION COSTS (2+10+12+13-15)	-8807.43	-6923.10	-7570.88	-8270.03	-8631.01	-8847.68	-9070.33	-9298.83	-9532.97	-9772.50
20. GROSS PROFIT (1+19)	-4536.15	-1148.33	-179.17	858.72	1362.58	1545.65	1738.73	1942.59	2158.11	2386.22
21. CORPORATE TAX										
22. NET PROFIT	-4536.15	-1148.33	-179.17	858.72	1362.58	1545.65	1738.73	1942.59	2158.11	2386.22

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
*****										
INDUSTRIAL MARGIN (11)	256.05	1159.87	2129.03	3166.92	3592.85	3690.20	3788.98	3889.12	3990.54	4093.15
INTEREST COST (15)	3726.00	1242.00	1242.00	1242.00	1164.07	1078.35	984.05	890.33	766.23	640.72
AMORTIZATION OF LOAN (17)				779.30	857.23	942.95	1037.25	1140.97	1255.07	1380.57
A. WORKING CAPITAL	3772.45	3501.13	4100.63	4745.61	5070.72	5237.29	5409.60	5587.75	5771.81	5961.88
B. CASH FLOW (11-15-17)	-3469.95	-82.13	887.03	1145.63	1571.55	1668.90	1767.69	1867.82	1969.24	2071.85
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-3368.89	-77.42	811.75	1017.87	1355.64	1397.68	1437.29	1474.48	1509.26	1541.65
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-3368.89	-3446.30	-2634.55	-1616.68	-261.04	1136.64	2573.93	4048.41	5557.67	7099.32
F. PAY OUT TIME	6.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
PRODUCTION COSTS (19)	-8807.43	-6923.10	-7570.88	-8270.03	-8631.01	-8847.68	-9070.33	-9298.83	-9532.97	-9772.50
GROSS PROFIT (20)	-4536.15	-1148.33	-179.17	858.72	1362.58	1545.65	1738.73	1942.59	2158.11	2386.22
CORPORATE TAX (21)										
NET PROFIT (22)	-4536.15	-1148.33	-179.17	858.72	1362.58	1545.65	1738.73	1942.59	2158.11	2386.22
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-4536.15	-1148.33	-179.17	858.72	1362.58	1545.65	1738.73	1942.59	2158.11	2386.22
ACUMULATED UNIDISTRIBUTED PROFITS	-4536.15	-5684.48	-5863.66	-5004.93	-3642.35	-2096.70	-357.97	1584.63	3742.74	6128.96
TOTAL INVESTMENT	12420.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

BASE CASE "B"

EVALUATION - 1

We assume:

- Most likely values.
- Current prices.

Results:

- Rates of return on  
total investment ..... 42,6%
- Pay-back period ..... 2 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3411.85	4601.66	5875.68	7238.46	7904.31	8199.59	8505.64	8822.83	9151.56	9492.23
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.84	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-19.19	-19.74	-20.36	-20.97	-21.60	-22.25	-22.91	-23.60	-24.31	-25.04
8. MAINTENANCE-REPAIR COST	-115.13	-118.59	-122.15	-125.81	-129.58	-133.47	-137.48	-141.60	-145.85	-150.22
9. MARKETING COST	-128.14	-173.24	-221.75	-273.86	-299.81	-311.80	-324.27	-337.24	-350.73	-364.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2842.39	-3118.97	-3414.15	-3729.06	-3958.71	-4146.05	-4342.42	-4548.24	-4763.99	-4990.14
11. INDUSTRIAL MARGIN (3+10)	569.47	1482.69	2461.53	3509.41	3945.61	4053.54	4163.22	4274.59	4387.57	4502.09
12. DEPRECIATION COST-A (EQUIPMENT)	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60
13. DEPRECIATION COST-B (BUILDINGS)										
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	3726.00	3726.00	3726.00	3726.00	3456.32	3167.77	2859.01	2528.64	2175.15	1796.91
15. INTEREST COST	782.46	260.82	260.82	260.82	241.94	221.74	200.13	177.00	152.26	125.78
16. AMORTIZATION FEE				530.50	530.50	530.50	530.50	530.50	530.50	530.50
17. AMORTIZATION OF LOAN				269.68	288.56	308.76	330.37	353.49	378.24	404.71
18. ACCUMULATED AMORTIZATION OF LOAN				269.68	558.23	866.99	1197.36	1550.85	1929.09	2333.80
19. PRODUCTION COSTS (2+10+12+13-15)	-4856.87	-4925.50	-5563.60	-6252.77	-6662.52	-6934.13	-7218.57	-7516.44	-7828.37	-8155.02
20. GROSS PROFIT (1+19)	-585.59	849.27	1828.11	2875.99	3331.06	3459.20	3590.49	3724.98	3862.71	4003.71
21. CORPORATE TAX										
22. NET PROFIT	-585.59	849.27	1828.11	2875.99	3331.06	3459.20	3590.49	3724.98	3862.71	4003.71

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	569.47	1482.69	2461.53	3509.41	3945.61	4053.54	4163.22	4274.59	4387.57	4502.09
INTEREST COST (15)	782.46	260.82	260.82	260.82	241.94	221.74	200.13	177.00	152.26	125.78
AMORTIZATION OF LOAN (17)				269.68	288.56	308.76	330.37	353.49	378.24	404.71
A. WORKING CAPITAL	2571.19	2950.86	3547.14	4188.79	4530.16	4715.05	4907.95	5109.22	5319.21	5538.32
B. CASH FLOW (11-15-17)	-212.99	1221.87	2200.71	2978.91	3415.11	3523.04	3632.72	3744.09	3857.07	3971.59
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-206.79	1151.73	2013.96	2646.72	2945.90	2950.49	2953.74	2955.62	2956.12	2955.24
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-206.79	944.94	2958.90	5605.62	8551.52	11502.02	14455.75	17411.37	20367.49	23322.73
F. PAY OUT TIME	2.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
PRODUCTION COSTS (19)	-4856.87	-4925.50	-5563.60	-6252.77	-6662.52	-6934.13	-7218.57	-7516.44	-7828.37	-8155.02
GROSS PROFIT (20)	-585.59	849.27	1828.11	2875.99	3331.06	3459.20	3590.49	3724.98	3862.71	4003.71
CORPORATE TAX (21)										
NET PROFIT (22)	-585.59	849.27	1828.11	2875.99	3331.06	3459.20	3590.49	3724.98	3862.71	4003.71
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-585.59	849.27	1828.11	2875.99	3331.06	3459.20	3590.49	3724.98	3862.71	4003.71
ACUMULATED UNDISTRICTED PROFITS	-585.59	263.68	2091.79	4967.77	8298.84	11758.03	15348.52	19073.51	22936.22	26939.92
TOTAL INVESTMENT	3726.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	42.60									

BASE CASE "B"

EVALUATION - 2

We assume:

- All variables as in Evaluation 1.
- 10% increase in sales

Results:

- Rates of return on  
total investment ..... 54,4%
- Pay-back period ..... 1 year



	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
*****										
PRODUCTION COSTS AND										
NET INCOME STATEMENT										
IN THOUSAND DOLLARS										
*****										
1. TOTAL SALES	4698.20	6351.97	8130.52	10041.19	10972.46	11432.16	11889.44	12365.02	12859.62	13374.01
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3838.77	5178.85	6614.49	8150.89	8903.19	9238.42	9586.02	9946.43	10320.10	10707.51
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.89	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-19.19	-19.76	-20.36	-20.97	-21.60	-22.25	-22.91	-23.60	-24.31	-25.04
8. MAINTENANCE-REPAIR COST	-115.13	-118.59	-122.15	-125.81	-129.58	-133.47	-137.48	-141.60	-145.85	-150.22
9. MARKETING COST	-140.95	-190.56	-243.92	-301.24	-329.77	-342.96	-356.68	-370.95	-385.79	-401.22
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2855.20	-3136.28	-3436.31	-3756.43	-3988.67	-4177.22	-4374.83	-4581.95	-4799.04	-5026.60
11. INDUSTRIAL MARGIN (3+10)	983.58	2042.57	3178.18	4394.46	4914.51	5061.20	5211.19	5364.48	5521.05	5680.91
12. DEPRECIATION COST-A (EQUIPMENT)	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60
13. DEPRECIATION COST-B (BUILDINGS)										
BANK LOANS										
14. OUTSTANDING BALANCE OF LOAN	3726.00	3726.00	3726.00	3726.00	3456.32	3167.77	2859.01	2528.64	2175.15	1796.91
15. INTEREST COST	782.46	260.82	260.82	260.82	241.94	221.74	200.13	177.00	152.26	125.78
16. AMORTIZATION FEE				530.50	530.50	530.50	530.50	530.50	530.50	530.50
17. AMORTIZATION OF LOAN				269.68	288.56	308.76	330.37	353.49	378.24	404.71
18. ACUMULATED AMORTIZATION OF LOAN				269.68	558.23	866.99	1197.36	1550.85	1929.09	2333.80
19. PRODUCTION COSTS (2+10+12+13-15)	-4849.68	-4942.82	-5585.76	-6280.15	-6692.49	-6965.30	-7250.98	-7550.15	-7863.43	-8191.48
20. GROSS PROFIT (1+19)	-171.48	1409.15	2544.76	3761.04	4299.97	4466.86	4638.46	4814.87	4996.19	5182.53
21. CORPORATE TAX										
22. NET PROFIT	-171.48	1409.15	2544.76	3761.04	4299.97	4466.86	4638.46	4814.87	4996.19	5182.53

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
*****										
INDUSTRIAL MARGIN (11)	983.58	2042.57	3178.18	4394.46	4914.51	5061.20	5211.19	5364.48	5521.05	5680.91
INTEREST COST (15)	782.46	260.82	260.82	260.82	241.94	221.74	200.13	177.00	152.26	125.78
AMORTIZATION OF LOAN (17)				269.68	288.56	308.76	330.37	353.49	378.24	404.71
A. WORKING CAPITAL	2682.19	3100.93	3739.23	4426.03	4789.87	4985.14	5188.85	5401.35	5623.03	5854.29
B. CASH FLOW (11-15-17)	201.12	1781.75	2917.36	3863.96	4384.01	4530.70	4680.69	4833.98	4990.55	5150.41
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	195.26	1679.47	2669.80	3433.08	3781.69	3794.39	3805.83	3815.99	3824.84	3832.39
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	195.26	1874.73	4544.53	7977.61	11759.30	15553.69	19359.52	23175.51	27000.35	30832.74
F. PAY OUT TIME	1.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4498.20	6351.97	8130.52	10041.19	10992.46	11432.16	11889.44	12365.02	12859.62	13374.01
PRODUCTION COSTS (19)	-4869.68	-4942.82	-5585.76	-6280.15	-6692.49	-6965.30	-7250.98	-7550.15	-7863.43	-8191.48
GROSS PROFIT (20)	-171.48	1409.15	2544.76	3761.04	4299.97	4466.86	4638.46	4814.87	4996.19	5182.53
CORPORATE TAX (21)										
NET PROFIT (22)	-171.48	1409.15	2544.76	3761.04	4299.97	4466.86	4638.46	4814.87	4996.19	5182.53
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-171.48	1409.15	2544.76	3761.04	4299.97	4466.86	4638.46	4814.87	4996.19	5182.53
ACUMULATED UNDISTRIBUTED PROFITS	-171.48	1237.67	3782.43	7543.47	11843.44	16310.30	20948.76	25763.63	30759.82	35942.35
TOTAL INVESTMENT	3726.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	54.40									

BASE CASE "B"

EVALUATION - 3

We assume:

- All variables as in Evaluation 1.
- 5% increase in sales

Results:

- Rates of return on  
total investment ..... 48,6%
- Pay-back period ..... 2 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	4485.00	6063.72	7761.56	9585.53	10493.63	10913.38	11349.91	11803.91	12276.06	12767.11
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3625.57	4890.60	6245.54	7695.23	8404.36	8719.64	9046.49	9385.31	9736.54	10100.61
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-19.19	-19.76	-20.36	-20.97	-21.60	-22.25	-22.91	-23.60	-24.31	-25.04
8. MAINTENANCE-REPAIR COST	-115.13	-118.59	-122.15	-125.81	-129.58	-133.47	-137.48	-141.60	-145.85	-150.22
9. MARKETING COST	-134.55	-181.91	-232.85	-287.57	-314.81	-327.40	-340.50	-354.12	-368.28	-383.01
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2848.80	-3127.63	-3425.25	-3742.76	-3973.71	-4161.65	-4358.64	-4565.12	-4781.54	-5008.39
11. INDUSTRIAL MARGIN (3+10)	776.78	1762.97	2820.29	3952.47	4430.65	4557.99	4687.84	4820.20	4955.00	5092.22
12. DEPRECIATION COST-A (EQUIPMENT)	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60
13. DEPRECIATION COST-B (BUILDINGS)										
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	3726.00	3726.00	3726.00	3726.00	3456.32	3167.77	2859.01	2528.64	2175.15	1796.91
15. INTEREST COST	782.46	260.82	260.82	260.82	241.94	221.74	200.13	177.00	152.26	125.78
16. AMORTIZATION FEE				530.50	530.50	530.50	530.50	530.50	530.50	530.50
17. AMORTIZATION OF LOAN				269.68	288.56	308.76	330.37	353.49	378.24	404.71
18. ACUMULATED AMORTIZATION OF LOAN				269.68	558.23	866.99	1197.36	1550.85	1929.09	2333.80
19. PRODUCTION COSTS (2+10+12+13-15)	-4863.28	-4934.17	-5574.69	-6266.48	-6677.52	-6949.73	-7234.80	-7533.32	-7845.92	-8173.27
20. GROSS PROFIT (1+19)	-378.28	1129.55	2186.87	3319.05	3816.11	3963.64	4115.11	4270.59	4430.14	4593.83
21. CORPORATE TAX										
22. NET PROFIT	-378.28	1129.55	2186.87	3319.05	3816.11	3963.64	4115.11	4270.59	4430.14	4593.83

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
*****										
INDUSTRIAL MARGIN (11)	776.78	1762.97	2820.29	3952.47	4430.65	4557.99	4687.84	4820.20	4955.00	5092.22
INTEREST COST (15)	782.46	260.82	260.82	260.82	241.94	221.74	200.13	177.00	152.26	125.78
AMORTIZATION OF LOAN (17)				269.68	288.56	308.76	330.37	353.49	378.24	404.71
A. WORKING CAPITAL	2626.76	3025.99	3643.30	4307.55	4660.17	4850.26	5048.57	5255.46	5471.31	5696.50
B. CASH FLOW (11-15-17)	-5.68	1502.15	2559.47	3421.97	3900.15	4027.49	4157.35	4289.70	4424.50	4561.72
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-5.52	1415.92	2342.28	3040.38	3364.30	3372.96	3380.30	3386.33	3391.01	3394.35
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-5.52	1410.40	3752.68	6793.06	10157.36	13530.32	16910.62	20296.95	23687.96	27082.31
F. PAY OUT TIME	2.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4485.00	6063.72	7761.56	9585.53	10493.63	10913.38	11349.91	11803.91	12276.06	12767.11
PRODUCTION COSTS (19)	-4863.28	-4934.17	-5574.69	-6266.48	-6677.52	-6949.73	-7234.80	-7533.32	-7845.92	-8173.27
GROSS PROFIT (20)	-378.28	1129.55	2186.87	3319.05	3816.11	3963.64	4115.11	4270.59	4430.14	4593.83
CORPORATE TAX (21)										
NET PROFIT (22)	-378.28	1129.55	2186.87	3319.05	3816.11	3963.64	4115.11	4270.59	4430.14	4593.83
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-378.28	1129.55	2186.87	3319.05	3816.11	3963.64	4115.11	4270.59	4430.14	4593.83
ACUMULATED UNDISTRICTED PROFITS	-378.28	751.27	2938.14	6257.19	10073.30	14036.94	18152.05	22422.64	26852.78	31446.62
TOTAL INVESTMENT	3726.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	48.60									

BASE CASE "B"

EVALUATION - 4

We assume:

- All variables as in Evaluation 1.
- 5% decrease in sales

Results:

- Rates of return on  
total investment ..... 36,4%
- Pay-back period ..... 2 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	4057.56	5485.82	7021.85	8671.99	9493.54	9873.28	10268.22	10678.94	11106.10	11550.35
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3198.13	4312.71	5505.83	6781.69	7404.27	7679.55	7964.79	8260.35	8566.58	8883.85
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-19.19	-19.76	-20.36	-20.97	-21.60	-22.25	-22.91	-23.60	-24.31	-25.04
8. MAINTENANCE-REPAIR COST	-115.13	-118.59	-122.15	-125.81	-129.58	-133.47	-137.48	-141.60	-145.85	-150.22
9. MARKETING COST	-121.73	-164.57	-210.66	-260.16	-284.81	-296.20	-308.05	-320.37	-333.18	-346.51
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2835.98	-3110.30	-3403.05	-3715.35	-3943.71	-4130.45	-4326.19	-4531.37	-4746.44	-4971.89
11. INDUSTRIAL MARGIN (3+10)	362.16	1202.41	2102.77	3066.34	3460.56	3549.10	3638.60	3728.98	3820.14	3911.96
12. DEPRECIATION COST-A (EQUIPMENT)	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60
13. DEPRECIATION COST-B (BUILDINGS)										
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	3726.00	3726.00	3726.00	3726.00	3456.32	3167.77	2859.01	2528.64	2175.15	1796.91
15. INTEREST COST	782.46	260.82	260.82	260.82	241.94	221.74	200.13	177.00	152.26	125.78
16. AMORTIZATION FEE				530.50	530.50	530.50	530.50	530.50	530.50	530.50
17. AMORTIZATION OF LOAN				269.68	288.56	308.76	330.37	353.49	378.24	404.71
18. ACCUMULATED AMORTIZATION OF LOAN				269.68	558.23	866.99	1197.36	1550.85	1929.09	2333.80
19. PRODUCTION COSTS (2+10+12+13-15)	-4850.46	-4916.83	-5552.50	-6239.07	-6647.52	-6918.53	-7202.35	-7499.57	-7810.82	-8136.77
20. GROSS PROFIT (1+19)	-792.90	568.99	1469.35	2432.92	2846.02	2954.75	3065.87	3179.38	3295.28	3413.58
21. CORPORATE TAX										
22. NET PROFIT	-792.90	568.99	1469.35	2432.92	2846.02	2954.75	3065.87	3179.38	3295.28	3413.58

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
*****										
INDUSTRIAL MARGIN (11)	362.16	1202.41	2102.77	3066.34	3460.56	3549.10	3638.60	3728.98	3820.14	3911.96
INTEREST COST (15)	782.46	260.82	260.82	260.82	241.94	221.74	200.13	177.00	152.26	125.78
AMORTIZATION OF LOAN (17)				269.68	288.56	308.76	330.37	353.49	378.24	404.71
A. WORKING CAPITAL	2515.63	2875.73	3450.98	4070.03	4400.15	4579.83	4767.33	4962.97	5167.12	5380.14
B. CASH FLOW (11-15-17)	-420.30	941.59	1841.95	2535.84	2930.07	3018.60	3108.10	3198.48	3289.64	3381.46
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-408.06	887.54	1685.65	2253.06	2527.50	2528.03	2527.17	2524.91	2521.24	2516.13
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-408.06	479.48	2165.12	4418.16	6945.68	9473.71	12000.88	14525.79	17047.03	19563.15
F. PAY OUT TIME	2.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4057.56	5485.82	7021.85	8671.99	9493.54	9873.28	10268.22	10678.94	11106.10	11550.35
PRODUCTION COSTS (19)	-4850.46	-4916.83	-5552.50	-6239.07	-6647.52	-6918.53	-7202.35	-7499.57	-7810.82	-8136.77
GROSS PROFIT (20)	-792.90	568.99	1469.35	2432.92	2846.02	2954.75	3065.87	3179.38	3295.28	3413.58
CORPORATE TAX (21)										
NET PROFIT (22)	-792.90	568.99	1469.35	2432.92	2846.02	2954.75	3065.87	3179.38	3295.28	3413.58
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-792.90	568.99	1469.35	2432.92	2846.02	2954.75	3065.87	3179.38	3295.28	3413.58
ACUMULATED UNDISTRICTED PROFITS	-792.90	-223.91	1245.44	3678.35	6524.38	9479.13	12545.00	15724.37	19019.65	22433.23
TOTAL INVESTMENT	3726.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	36.40									



BASE CASE "B"

EVALUATION - 5

We assume:

- All variables as in Evaluation 1.
- 10% decrease in sales.

Results:

- Rates of return on  
total investment ..... 30%
- Pay-back period ..... 2 years

	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
*****										
PRODUCTION COSTS AND										
NET INCOME STATEMENT										
IN THOUSAND DOLLARS										
*****										
1. TOTAL SALES	3844.36	5197.57	6652.90	8216.33	8994.71	9354.50	9728.68	10117.83	10522.54	10943.45
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	2984.93	4024.46	5136.87	6326.03	6905.44	7160.77	7425.26	7699.24	7983.02	8276.95
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-19.19	-19.76	-20.36	-20.97	-21.60	-22.25	-22.91	-23.60	-24.31	-25.04
8. MAINTENANCE-REPAIR COST	-115.13	-118.59	-122.15	-125.81	-129.58	-133.47	-137.48	-141.60	-145.85	-150.22
9. MARKETING COST	-115.33	-155.93	-199.59	-246.49	-269.84	-280.64	-291.86	-303.53	-315.68	-328.30
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2829.58	-3101.65	-3391.99	-3701.68	-3928.74	-4114.89	-4310.01	-4514.54	-4728.93	-4953.68
11. INDUSTRIAL MARGIN (3+10)	155.35	922.81	1744.88	2624.35	2976.70	3045.88	3115.25	3184.70	3254.09	3323.27
12. DEPRECIATION COST-A (EQUIPMENT)	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60
13. DEPRECIATION COST-B (BUILDINGS)										
BANK LOANS										
14. OUTSTANDING BALANCE OF LOAN	3726.00	3726.00	3726.00	3726.00	3456.32	3167.77	2859.01	2528.64	2175.15	1796.91
15. INTEREST COST	782.46	260.82	260.82	260.82	241.94	221.74	200.13	177.00	152.26	125.78
16. AMORTIZATION FEE				530.50	530.50	530.50	530.50	530.50	530.50	530.50
17. AMORTIZATION OF LOAN				269.68	288.56	308.76	330.37	353.49	378.24	404.71
18. ACUMULATED AMORTIZATION OF LOAN				269.68	558.23	866.99	1197.36	1550.85	1929.09	2333.80
19. PRODUCTION COSTS (2+10+12+13-15)	-4844.07	-4908.19	-5541.43	-6225.40	-6632.56	-6902.97	-7186.16	-7482.74	-7793.32	-8118.56
20. GROSS PROFIT (1+19)	-999.71	289.39	1111.46	1990.93	2362.16	2451.53	2542.52	2635.10	2729.23	2824.88
21. CORPORATE TAX										
22. NET PROFIT	-999.71	289.39	1111.46	1990.93	2362.16	2451.53	2542.52	2635.10	2729.23	2824.88

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	155.35	922.81	1744.88	2624.35	2976.70	3045.08	3115.25	3184.70	3254.09	3323.27
INTEREST COST (15)	782.46	260.82	260.82	260.82	241.94	221.74	200.13	177.00	152.26	125.78
AMORTIZATION OF LOAN (17)				269.68	288.56	308.76	330.37	353.49	378.24	404.71
A. WORKING CAPITAL	2460.19	2800.79	3355.05	3951.56	4270.45	4444.95	4627.05	4817.08	5015.39	5222.34
B. CASH FLOW (11-15-17)	-627.11	661.99	1484.06	2093.85	2446.20	2515.38	2584.75	2654.20	2723.59	2792.77
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-608.84	623.99	1358.13	1860.36	2110.12	2106.59	2101.64	2095.25	2087.40	2078.08
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-608.84	15.15	1373.28	3233.63	5343.75	7450.34	9551.98	11647.23	13734.64	15812.72
F. PAY OUT TIME	2.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	3844.36	5197.57	6652.90	8216.33	8994.71	9354.50	9728.68	10117.83	10522.54	10943.45
PRODUCTION COSTS (19)	-4844.07	-4908.19	-5541.43	-6225.40	-6632.56	-6902.97	-7186.16	-7482.74	-7793.32	-8118.56
GROSS PROFIT (20)	-999.71	289.39	1111.46	1990.93	2362.16	2451.53	2542.52	2635.10	2729.23	2824.88
CORPORATE TAX (21)										
NET PROFIT (22)	-999.71	289.39	1111.46	1990.93	2362.16	2451.53	2542.52	2635.10	2729.23	2824.88
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-999.71	289.39	1111.46	1990.93	2362.16	2451.53	2542.52	2635.10	2729.23	2824.88
ACUMULATED UNDISTRICTED PROFITS	-999.71	-710.32	401.15	2392.08	4754.23	7205.77	9748.29	12383.39	15112.61	17937.50
TOTAL INVESTMENT	3726.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	30.00									

BASE CASE "B"

EVALUATION - 6

We assume:

- All variables as in Evaluation 1.
- 10% increase in investment

Results:

- Rates of return on  
total investment ..... 38,8%
- Pay-back period ..... 2 years

FOSTER WHEELER IBERIA

PRODUCTION COSTS AND  
NET INCOME STATEMENT  
IN THOUSAND DOLLARS

\*\*\*\*\*

	1	2	3
1. TOTAL SALES	4271.28	5774.77	7391.71
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03
3. OPERATING MARGIN (1+2)	3411.85	4601.66	5875.68
4. UTILITIES COST	-320.90	-435.40	-559.32
5. LABOUR COST			
CATEGORY-A	-153.30	-160.96	-169.01
CATEGORY-B	-1222.20	-1283.31	-1347.48
CATEGORY-C	-490.35	-514.87	-540.61
CATEGORY-D	-285.60	-299.88	-314.87
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97
6. OVERHEAD COST	-107.57	-112.95	-118.60
7. INSURANCE COST	-21.11	-21.74	-22.40
8. MAINTENANCE-REPAIR COST	-126.66	-130.46	-134.37
9. MARKETING COST	-128.14	-173.24	-221.75
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2855.83	-3132.82	-3428.42
11. INDUSTRIAL MARGIN (3+10)	556.02	1468.84	2447.27
12. DEPRECIATION COST-A (EQUIPMENT)	-409.90	-409.90	-409.90
13. DEPRECIATION COST-B (BUILDINGS)			
BANK LOANS			
14. OUTSTANDING BALANCE OF LOAN	4099.00	4099.00	4099.00
15. INTEREST COST	860.79	286.93	286.93
16. AMORTIZATION FEE			
17. AMORTIZATION OF LOAN			
18. ACUMULATED AMORTIZATION OF LOAN			
19. PRODUCTION COSTS (2+10+12+13-15)	-4985.95	-5002.76	-5641.27
20. GROSS PROFIT (1+19)	-714.67	772.01	1750.44
21. CORPORATE TAX			
22. NET PROFIT	-714.67	772.01	1750.44

BASE

4	5	6	7	8	9	10
9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
7238.46	7904.31	8199.59	8505.64	8822.83	9151.56	9492.23
-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
-23.07	-23.76	-24.47	-25.21	-25.96	-26.74	-27.54
-138.40	-142.56	-146.83	-151.24	-155.77	-160.45	-165.26
-273.86	-299.81	-311.80	-324.27	-337.24	-350.73	-364.76
-3743.75	-3973.84	-4161.64	-4358.48	-4564.78	-4781.02	-5007.68
3494.71	3930.47	4037.95	4147.17	4258.05	4370.54	4484.54
-409.90	-409.90	-409.90	-409.90	-409.90	-409.90	-409.90
4099.00	3802.32	3484.88	3145.22	2781.78	2392.90	1976.79
286.93	266.16	243.94	220.17	194.72	167.50	138.38
583.61	583.61	583.61	583.61	583.61	583.61	583.61
296.68	317.44	339.66	363.44	388.88	416.10	445.23
296.68	611.12	953.78	1317.22	1706.10	2122.21	2567.44
-6330.88	-6739.18	-7009.22	-7291.96	-7588.00	-7897.95	-8222.46
2797.88	3254.41	3384.11	3517.10	3653.43	3793.13	3936.27
2797.88	3254.41	3384.11	3517.10	3653.43	3793.13	3936.27

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IPERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	556.02	1468.84	2447.27	3494.71	3930.47	4037.95	4147.17	4258.05	4370.54	4484.54
INTEREST COST (15)	860.79	286.93	286.93	286.93	266.16	243.94	220.17	194.72	167.50	138.38
AMORTIZATION OF LOAN (17)				296.68	317.44	339.66	363.44	388.88	416.10	445.23
A. WORKING CAPITAL	2608.00	2970.40	3566.81	4208.61	4549.50	4733.86	4926.19	5126.85	5336.19	5554.58
B. CASH FLOW (11-15-17)	-304.77	1181.91	2160.34	2911.11	3346.87	3454.35	3563.56	3674.44	3786.93	3900.94
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-295.89	1114.06	1977.01	2586.48	2887.04	2892.96	2897.50	2900.64	2902.37	2902.67
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-295.89	818.17	2795.18	5381.66	8268.70	11161.66	14059.16	16959.80	19862.17	22764.83
F. PAY OUT TIME	2.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
PRODUCTION COSTS (19)	-4985.95	-5002.76	-5641.27	-6330.88	-6739.18	-7009.22	-7291.96	-7588.00	-7897.95	-8222.46
GROSS PROFIT (20)	-714.67	772.01	1750.44	2797.88	3254.41	3384.11	3517.10	3653.43	3793.13	3936.27
CORPORATE TAX (21)										
NET PROFIT (22)	-714.67	772.01	1750.44	2797.88	3254.41	3384.11	3517.10	3653.43	3793.13	3936.27
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-714.67	772.01	1750.44	2797.88	3254.41	3384.11	3517.10	3653.43	3793.13	3936.27
ACUMULATED UNDISTRIBUTED PROFITS	-714.67	57.34	1807.77	4605.66	7860.07	11244.18	14761.28	18414.70	22207.84	26144.10
TOTAL INVESTMENT	4099.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	38.80									

BASE CASE "B"

EVALUATION - 7

We assume:

- All variables as in Evaluation 1.
- 10% decrease in investment.

Results:

- Rates of return on  
total investment ..... 51,4%
- Pay-back period ..... 2 years



	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>PRODUCTION COSTS AND NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
2. TOTAL RAW MATERIAL COST	-818.50	-1044.05	-1309.60	-1555.15	-1637.00	-1637.00	-1637.00	-1637.00	-1637.00	-1637.00
3. OPERATING MARGIN (1+2)	3452.78	4710.72	6082.11	7573.61	8356.59	8756.33	9172.06	9604.43	10054.08	10521.73
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-17.27	-17.79	-18.32	-18.87	-19.44	-20.02	-20.62	-21.24	-21.87	-22.53
8. MAINTENANCE-REPAIR COST	-103.61	-106.72	-109.92	-113.21	-116.61	-120.11	-123.71	-127.42	-131.25	-135.18
9. MARKETING COST	-128.14	-173.24	-221.75	-273.86	-299.81	-311.80	-324.27	-337.24	-350.73	-364.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2828.94	-3105.12	-3399.88	-3714.36	-3943.57	-4130.46	-4326.36	-4531.71	-4746.95	-4972.59
11. INDUSTRIAL MARGIN (3+10)	623.84	1605.60	2682.22	3859.24	4413.01	4625.87	4845.70	5072.72	5307.13	5549.13
12. DEPRECIATION COST-A (EQUIPMENT)	-335.30	-335.30	-335.30	-335.30	-335.30	-335.30	-335.30	-335.30	-335.30	-335.30
13. DEPRECIATION COST-B (BUILDINGS)										
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	3353.00	3353.00	3353.00	3353.00	3110.32	2850.65	2572.80	2275.51	1957.40	1617.03
15. INTEREST COST	704.13	234.71	234.71	234.71	217.72	199.55	180.10	159.29	137.02	113.19
16. AMORTIZATION FEE				477.39	477.39	477.39	477.39	477.39	477.39	477.39
17. AMORTIZATION OF LOAN				242.68	259.67	277.85	297.30	318.11	340.37	364.20
18. ACUMULATED AMORTIZATION OF LOAN				242.68	502.35	780.20	1077.49	1395.60	1735.97	2100.17
19. PRODUCTION COSTS (2+10+12+13-15)	-4686.87	-4739.18	-5279.49	-5839.52	-6133.60	-6302.31	-6478.76	-6663.29	-6856.27	-7058.08
20. GROSS PROFIT (1+19)	-415.59	1035.59	2112.21	3289.23	3859.99	4091.02	4330.30	4578.13	4834.81	5100.64
21. CORPORATE TAX										
22. NET PROFIT	-415.59	1035.59	2112.21	3289.23	3859.99	4091.02	4330.30	4578.13	4834.81	5100.64

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	623.84	1605.60	2682.22	3859.24	4413.01	4625.87	4845.70	5072.72	5307.13	5549.13
INTEREST COST (15)	704.13	234.71	234.71	234.71	217.72	199.55	180.10	159.29	137.02	113.19
AMORTIZATION OF LOAN (17)				242.68	259.67	277.85	297.30	318.11	340.37	364.20
A. WORKING CAPITAL	2520.74	2894.97	3458.65	4057.26	4360.07	4510.65	4667.56	4831.05	5001.40	5178.89
B. CASH FLOW (11-15-17)	-80.29	1370.89	2447.51	3381.85	3935.62	4148.47	4368.31	4595.33	4829.74	5071.74
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-77.95	1292.20	2239.82	3004.73	3394.90	3474.28	3551.83	3627.59	3701.59	3773.85
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-77.95	1214.25	3454.07	6458.80	9853.70	13327.98	16879.82	20507.41	24209.00	27982.86
F. PAY OUT TIME	2.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
PRODUCTION COSTS (19)	-4686.87	-4739.18	-5279.49	-5839.52	-6133.60	-6302.31	-6478.76	-6663.29	-6856.27	-7058.08
GROSS PROFIT (20)	-415.59	1035.59	2112.21	3289.23	3859.99	4091.02	4330.30	4578.13	4834.81	5100.64
CORPORATE TAX (21)										
NET PROFIT (22)	-415.59	1035.59	2112.21	3289.23	3859.99	4091.02	4330.30	4578.13	4834.81	5100.64
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-415.59	1035.59	2112.21	3289.23	3859.99	4091.02	4330.30	4578.13	4834.81	5100.64
ACUMULATED UNDISTRICTED PROFITS	-415.59	620.00	2732.22	6021.45	9881.44	13972.46	18302.76	22880.90	27715.71	32816.35
TOTAL INVESTMENT	3353.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	51.40									

BASE CASE "B"

EVALUATION - 8

We assume:

- All variables as in Evaluation 1.
- 10% increase in salaries

Results:

- Rates of return on  
total investment ..... 38,8%
- Pay-back period ..... 2 years

FOSTER WHEELER IBERIA

PRODUCTION COSTS AND  
NET INCOME STATEMENT  
IN THOUSAND DOLLARS  
\*\*\*\*\*

	1	2	3	4	5	6	7	8	9	10
1. TOTAL SALES	4271.28	5774.77	7391.71	9128.74	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3411.85	4601.66	5875.68	7238.46	7904.31	8199.59	8505.64	8822.83	9151.56	9492.23
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-169.05	-177.50	-186.38	-195.70	-205.48	-215.76	-226.54	-237.87	-249.76	-262.25
CATEGORY-B	-1344.00	-1411.20	-1481.74	-1555.85	-1633.64	-1715.32	-1801.09	-1891.14	-1985.70	-2084.99
CATEGORY-C	-539.70	-566.68	-595.02	-624.77	-656.01	-688.81	-723.25	-759.41	-797.38	-837.25
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2338.35	-2455.27	-2578.03	-2706.93	-2842.28	-2984.39	-3133.61	-3290.29	-3454.81	-3627.55
6. OVERHEAD COST	-116.92	-122.76	-128.90	-135.35	-142.11	-149.22	-156.68	-164.51	-172.74	-181.38
7. INSURANCE COST	-19.19	-19.76	-20.36	-20.97	-21.60	-22.25	-22.91	-23.60	-24.31	-25.04
8. MAINTENANCE-REPAIR COST	-115.13	-118.59	-122.15	-125.81	-129.58	-133.47	-137.48	-141.60	-145.85	-150.22
9. MARKETING COST	-128.14	-173.24	-221.75	-273.86	-299.81	-311.80	-324.27	-337.24	-350.73	-364.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-3038.63	-3325.02	-3630.51	-3956.24	-4197.24	-4396.52	-4605.41	-4824.38	-5053.93	-5294.58
11. INDUSTRIAL MARGIN (3+10)	373.22	1276.63	2245.17	3282.23	3707.07	3803.08	3900.23	3998.45	4097.63	4197.65
12. DEPRECIATION COST-A (EQUIPMENT)	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60
13. DEPRECIATION COST-B (BUILDINGS)										
BANK LOANS										
14. OUTSTANDING BALANCE OF LOAN	3726.00	3726.00	3726.00	3726.00	3456.32	3167.77	2859.01	2528.64	2175.15	1796.91
15. INTEREST COST	782.46	260.82	260.82	260.82	241.94	221.74	200.13	177.00	152.26	125.78
16. AMORTIZATION FEE				530.50	530.50	530.50	530.50	530.50	530.50	530.50
17. AMORTIZATION OF LOAN				269.68	288.56	308.74	330.37	353.49	378.24	404.71
18. ACCUMULATED AMORTIZATION OF LOAN				269.68	558.23	866.99	1197.36	1550.85	1929.09	2333.80
19. PRODUCTION COSTS (2+10+12+13-15)	-5053.12	-5131.56	-5779.96	-6479.95	-6901.06	-7184.60	-7481.56	-7792.58	-8118.32	-8459.46
20. GROSS PROFIT (1+19)	-781.84	643.21	1611.75	2648.81	3092.53	3208.73	3327.50	3448.85	3572.77	3699.27
21. CORPORATE TAX										
22. NET PROFIT	-781.84	643.21	1611.75	2648.81	3092.53	3208.73	3327.50	3448.85	3572.77	3699.27

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
*****										
INDUSTRIAL MARGIN (11)	373.22	1276.63	2245.17	3282.23	3707.07	3803.08	3900.23	3998.45	4097.63	4197.65
INTEREST COST (15)	782.46	260.82	260.82	260.82	241.94	221.74	200.13	177.00	152.26	125.78
AMORTIZATION OF LOAN (17)				269.68	288.56	308.76	330.37	353.49	378.24	404.71
A. WORKING CAPITAL	2636.61	3019.55	3619.26	4264.52	4609.67	4798.53	4995.61	5201.26	5415.86	5639.80
B. CASH FLOW (11-15-17)	-409.24	1015.81	1984.35	2751.73	3176.57	3272.58	3369.74	3467.95	3567.13	3667.15
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-397.32	957.50	1815.96	2444.87	2740.14	2740.73	2739.90	2737.63	2733.91	2728.70
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-397.32	560.18	2376.14	4821.02	7561.16	10301.89	13041.79	15779.43	18513.33	21242.04
F. PAY OUT TIME	2.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
PRODUCTION COSTS (19)	-5053.12	-5131.56	-5779.96	-6479.95	-6901.06	-7184.60	-7481.56	-7792.58	-8118.32	-8459.46
GROSS PROFIT (20)	-781.84	643.21	1611.75	2648.81	3092.53	3208.73	3327.50	3448.85	3572.77	3699.27
CORPORATE TAX (21)										
NET PROFIT (22)	-781.84	643.21	1611.75	2648.81	3092.53	3208.73	3327.50	3448.85	3572.77	3699.27
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-781.84	643.21	1611.75	2648.81	3092.53	3208.73	3327.50	3448.85	3572.77	3699.27
ACUMULATED UNDISTRIBUTED PROFITS	-781.84	-138.63	1473.12	4121.93	7214.46	10423.19	13750.70	17199.54	20772.31	24471.57
TOTAL INVESTMENT	3726.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	38.80									

BASE CASE "B"

EVALUATION - 9

We assume:

- All variables as in Evaluation 1.
- 10% decrease in salaries

Results:

- Rates of return on  
total investment ..... 46,6%
- Pay-back period ..... 2 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>*****</b>										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
<b>*****</b>										
1. TOTAL SALES	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3411.85	4601.66	5875.68	7238.46	7904.31	8199.59	8505.64	8822.83	9151.56	9492.23
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-137.55	-144.43	-151.65	-159.23	-167.19	-175.55	-184.33	-193.55	-203.22	-213.39
CATEGORY-B	-1100.40	-1155.42	-1213.19	-1273.85	-1337.54	-1404.42	-1474.64	-1548.37	-1625.79	-1707.08
CATEGORY-C	-441.00	-463.05	-486.20	-510.51	-536.04	-562.84	-590.98	-620.53	-651.56	-684.14
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-1964.55	-2062.78	-2165.92	-2274.21	-2387.92	-2507.32	-2632.68	-2764.32	-2902.54	-3047.66
6. OVERHEAD COST	-98.23	-103.14	-108.30	-113.71	-119.40	-125.37	-131.63	-138.22	-145.13	-152.38
7. INSURANCE COST	-19.19	-19.76	-20.36	-20.97	-21.60	-22.25	-22.91	-23.60	-24.31	-25.04
8. MAINTENANCE-REPAIR COST	-115.13	-118.59	-122.15	-125.81	-129.58	-133.47	-137.48	-141.60	-145.85	-150.22
9. MARKETING COST	-128.14	-173.24	-221.75	-273.86	-299.81	-311.80	-324.27	-337.24	-350.73	-364.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2646.14	-2912.91	-3197.79	-3501.88	-3720.17	-3895.59	-4079.43	-4272.11	-4474.05	-4685.70
11. INDUSTRIAL MARGIN (3+10)	765.71	1688.75	2677.89	3736.58	4184.14	4304.00	4426.21	4550.72	4677.51	4806.53
12. DEPRECIATION COST-A (EQUIPMENT)	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60
13. DEPRECIATION COST-B (BUILDINGS)										
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	3726.00	3726.00	3726.00	3726.00	3456.32	3167.77	2859.01	2528.64	2175.15	1796.91
15. INTEREST COST	782.46	260.82	260.82	260.82	241.94	221.74	200.13	177.00	152.26	125.78
16. AMORTIZATION FEE				530.50	530.50	530.50	530.50	530.50	530.50	530.50
17. AMORTIZATION OF LOAN				269.68	288.56	308.76	330.37	353.49	378.24	404.71
18. ACUMULATED AMORTIZATION OF LOAN				269.68	558.23	866.99	1197.36	1550.85	1929.09	2333.80
19. PRODUCTION COSTS (2+10+12+13-15)	-4660.63	-4719.44	-5347.24	-6025.59	-6423.99	-6683.67	-6955.59	-7240.31	-7538.43	-7850.58
20. GROSS PROFIT (1+19)	-389.35	1055.33	2044.47	3103.16	3569.60	3709.66	3853.48	4001.12	4152.65	4308.15
21. CORPORATE TAX										
22. NET PROFIT	-389.35	1055.33	2044.47	3103.16	3569.60	3709.66	3853.48	4001.12	4152.65	4308.15

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
*****										
INDUSTRIAL MARGIN (11)	765.71	1688.75	2677.89	3736.58	4184.14	4304.00	4426.21	4550.72	4677.51	4806.53
INTEREST COST (15)	782.46	260.82	260.82	260.82	241.94	221.74	200.13	177.00	152.26	125.78
AMORTIZATION OF LOAN (17)				269.68	288.56	308.76	330.37	353.49	378.24	404.71
A. WORKING CAPITAL	2505.78	2882.17	3475.02	4113.07	4450.65	4631.56	4820.29	5017.17	5222.56	5436.84
B. CASH FLOW (11-15-17)	-16.75	1427.93	2417.07	3206.08	3653.65	3773.51	3895.71	4020.23	4147.02	4276.03
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW DISCOUNT FACTOR (B * C)	-16.26	1345.96	2211.96	2848.56	3151.67	3160.25	3167.57	3173.60	3178.34	3181.77
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-16.26	1329.70	3541.66	6390.22	9541.89	12702.14	15869.71	19043.31	22221.66	25403.42
F. PAY OUT TIME	2.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
PRODUCTION COSTS (19)	-4660.63	-4719.44	-5347.24	-6025.59	-6423.99	-6683.67	-6955.59	-7240.31	-7538.43	-7850.58
GROSS PROFIT (20)	-389.35	1055.33	2044.47	3103.16	3569.60	3709.66	3853.48	4001.12	4152.65	4308.15
CORPORATE TAX (21)										
NET PROFIT (22)	-389.35	1055.33	2044.47	3103.16	3569.60	3709.66	3853.48	4001.12	4152.65	4308.15
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-389.35	1055.33	2044.47	3103.16	3569.60	3709.66	3853.48	4001.12	4152.65	4308.15
ACUMULATED UNDISTRICTED PROFITS	-389.35	665.98	2710.45	5813.61	9383.21	13092.87	16946.35	20947.47	25100.12	29408.27
TOTAL INVESTMENT	3726.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	46.60									



BASE CASE "B"

EVALUATION - 10

We assume:

- All variables as in Evaluation 1.
- Loan interest 4%

Results:

- Rates of return on  
total investment ..... 45,8%
- Pay-back period ..... 1 years

	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
-----										
PRODUCTION COSTS AND										
NET INCOME STATEMENT										
IN THOUSAND DOLLARS										
*****										
1. TOTAL SALES	4271.28	5774.77	7391.71	9128.74	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3411.85	4601.66	5875.68	7238.46	7904.31	8199.59	8505.64	8822.83	9151.56	9492.23
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-19.19	-19.76	-20.36	-20.97	-21.60	-22.25	-22.91	-23.60	-24.31	-25.04
8. MAINTENANCE-REPAIR COST	-115.13	-118.59	-122.15	-125.81	-129.58	-133.47	-137.48	-141.60	-145.85	-150.22
9. MARKETING COST	-128.14	-173.24	-221.75	-273.86	-299.81	-311.80	-324.27	-337.24	-350.73	-364.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2842.39	-3118.97	-3414.15	-3729.06	-3958.71	-4146.05	-4342.42	-4548.24	-4763.99	-4990.14
11. INDUSTRIAL MARGIN (3+10)	569.47	1482.69	2461.53	3509.41	3945.61	4053.54	4163.22	4274.59	4387.57	4502.09
12. DEPRECIATION COST-A (EQUIPMENT)	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60
13. DEPRECIATION COST-B (BUILDINGS)										
BANK LOANS										
14. OUTSTANDING BALANCE OF LOAN	3726.00	3726.00	3726.00	3726.00	3415.66	3092.90	2757.24	2408.14	2045.09	1667.51
15. INTEREST COST	447.12	149.04	149.04	149.04	135.63	123.72	110.29	96.33	81.80	66.70
16. AMORTIZATION FEE				459.38	459.38	459.38	459.38	459.38	459.38	459.38
17. AMORTIZATION OF LOAN				310.34	322.76	335.67	349.09	363.06	377.58	392.68
18. ACUMULATED AMORTIZATION OF LOAN				310.34	633.10	968.76	1317.86	1680.91	2058.49	2451.17
19. PRODUCTION COSTS (2+10+12+13-15)	-4521.53	-4813.72	-5451.82	-6140.99	-6557.21	-6836.11	-7128.73	-7435.76	-7757.92	-8095.94
20. GROSS PROFIT (1+19)	-250.25	961.05	1939.89	2987.77	3436.38	3557.22	3680.33	3805.66	3933.17	4062.79
21. CORPORATE TAX										
22. NET PROFIT	-250.25	961.05	1939.89	2987.77	3436.38	3557.22	3680.33	3805.66	3933.17	4062.79

	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
-----										
CASH FLOW TABLES										
*****										
INDUSTRIAL MARGIN (11)	569.47	1482.69	2461.53	3509.41	3945.61	4053.54	4163.22	4274.59	4387.57	4502.09
INTEREST COST (15)	447.12	149.04	149.04	149.04	136.63	123.72	110.29	96.33	81.80	66.70
AMORTIZATION OF LOAN (17)				310.34	322.76	335.67	349.09	363.06	377.58	392.68
A. WORKING CAPITAL	2459.41	2913.60	3509.88	4151.53	4495.06	4682.37	4878.00	5082.32	5295.73	5518.62
B. CASH FLOW (11-15-17)	122.35	1333.65	2312.49	3050.02	3486.22	3594.16	3703.84	3815.21	3928.19	4042.71
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	118.78	1257.09	2116.26	2709.91	3007.25	3010.05	3011.56	3011.76	3010.63	3008.15
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	118.78	1375.88	3492.13	6202.04	9209.29	12219.34	15230.90	18242.66	21253.29	24261.44
F. PAY OUT TIME	1.00									
NET INCOME STATEMENT										
-----										
TOTAL SALES (1)	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
PRODUCTION COSTS (19)	-4521.53	-4813.72	-5451.82	-6140.99	-6557.21	-6836.11	-7128.73	-7435.76	-7757.92	-8095.94
GROSS PROFIT (20)	-250.25	961.05	1939.89	2987.77	3436.38	3557.22	3680.33	3805.66	3933.17	4062.79
CORPORATE TAX (21)										
NET PROFIT (22)	-250.25	961.05	1939.89	2987.77	3436.38	3557.22	3680.33	3805.66	3933.17	4062.79
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-250.25	961.05	1939.89	2987.77	3436.38	3557.22	3680.33	3805.66	3933.17	4062.79
ACUMULATED UNDISTRICTED PROFITS	-250.25	710.80	2650.69	5638.45	9074.83	12632.06	16312.39	20118.05	24051.22	28114.01
TOTAL INVESTMENT	3726.00									
RATIOS										
-----										
RATE OF RETURN ON TOTAL INVESTMENT	45.80									

BASE CASE "B"

EVALUATION - 11

We assume:

- All variables as in Evaluation 1.
- Loan interest

Results:

- Rates of return on  
total investment ..... 39,8%
- Pay-back period ..... 2 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>-----</b>										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
<b>*****</b>										
1. TOTAL SALES	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
2. TOTAL RAW MATERIAL COST	-859.42	-1173.12	-1516.03	-1890.29	-2089.27	-2193.74	-2303.42	-2418.59	-2539.52	-2666.50
3. OPERATING MARGIN (1+2)	3411.85	4601.66	5875.68	7238.46	7904.31	8199.59	8505.64	8822.83	9151.56	9492.23
4. UTILITIES COST	-320.90	-435.40	-559.32	-693.32	-761.86	-795.39	-830.45	-867.13	-905.50	-945.63
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1222.20	-1283.31	-1347.48	-1414.85	-1485.59	-1559.87	-1637.86	-1719.76	-1805.75	-1896.03
CATEGORY-C	-490.35	-514.87	-540.61	-567.64	-596.02	-625.82	-657.12	-689.97	-724.47	-760.69
CATEGORY-D	-285.60	-299.88	-314.87	-330.62	-347.15	-364.51	-382.73	-401.87	-421.96	-443.06
TOTAL LABOUR COST	-2151.45	-2259.02	-2371.97	-2490.57	-2615.10	-2745.86	-2883.15	-3027.31	-3178.67	-3337.61
6. OVERHEAD COST	-107.57	-112.95	-118.60	-124.53	-130.76	-137.29	-144.16	-151.37	-158.93	-166.88
7. INSURANCE COST	-19.19	-19.76	-20.36	-20.97	-21.60	-22.25	-22.91	-23.60	-24.31	-25.04
8. MAINTENANCE-REPAIR COST	-115.13	-118.59	-122.15	-125.81	-129.58	-133.47	-137.48	-141.60	-145.85	-150.22
9. MARKETING COST	-128.14	-173.24	-221.75	-273.86	-299.81	-311.80	-324.27	-337.24	-350.73	-364.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2842.39	-3118.97	-3414.15	-3729.06	-3958.71	-4146.05	-4342.42	-4548.24	-4763.99	-4990.14
11. INDUSTRIAL MARGIN (3+10)	569.47	1482.69	2461.53	3509.41	3945.61	4053.54	4163.22	4274.59	4387.57	4502.09
12. DEPRECIATION COST-A (EQUIPMENT)	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60	-372.60
13. DEPRECIATION COST-B (BUILDINGS)										
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	3726.00	3726.00	3726.00	3726.00	3492.21	3235.04	2952.16	2640.98	2298.69	1922.17
15. INTEREST COST	1117.80	372.60	372.60	372.60	349.22	323.50	295.22	264.10	229.87	192.22
16. AMORTIZATION FEE				606.39	606.39	606.39	606.39	606.39	606.39	606.39
17. AMORTIZATION OF LOAN				233.79	257.17	282.89	311.17	342.29	376.52	414.17
18. ACUMULATED AMORTIZATION OF LOAN				233.79	490.96	773.84	1085.02	1427.31	1803.83	2218.00
19. PRODUCTION COSTS (2+10+12+13-15)	-5192.21	-5037.28	-5675.38	-6364.55	-6769.80	-7035.89	-7313.66	-7603.54	-7905.98	-8221.45
20. GROSS PROFIT (1+19)	-920.93	737.49	1716.33	2764.21	3223.79	3357.44	3495.41	3637.89	3785.10	3937.27
21. CORPORATE TAX										
22. NET PROFIT	-920.93	737.49	1716.33	764.21	3223.79	3357.44	3495.41	3637.89	3785.10	3937.27

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
*****										
INDUSTRIAL MARGIN (11)	569.47	1482.69	2461.53	3509.41	3945.61	4053.54	4163.22	4274.59	4387.57	4502.09
INTEREST COST (15)	1117.80	372.60	372.60	372.60	349.22	323.50	295.22	264.10	229.87	192.22
AMORTIZATION OF LOAN (17)				233.79	257.17	282.89	311.17	342.29	376.52	414.17
A. WORKING CAPITAL	2482.97	2988.12	3584.40	4226.05	4545.92	4748.97	4939.64	5138.25	5345.08	5560.46
B. CASH FLOW (11-15-17)	-548.33	1110.09	2088.93	2903.02	3339.22	3447.15	3556.83	3668.20	3781.18	3895.70
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-532.36	1046.37	1911.67	2579.29	2880.44	2886.93	2892.03	2895.71	2897.96	2898.77
E. ACCUMULATED CASH FLOW AT DEVALUATION RATE	-532.36	514.00	2425.67	5004.96	7885.40	10772.34	13664.37	16560.08	19458.04	22356.80
F. PAY OUT TIME	2.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	4271.28	5774.77	7391.71	9128.76	9993.59	10393.33	10809.06	11241.43	11691.08	12158.73
PRODUCTION COSTS (19)	-5192.21	-5037.28	-5675.38	-6364.55	-6769.80	-7035.89	-7313.66	-7603.54	-7905.98	-8221.45
GROSS PROFIT (20)	-920.93	737.49	1716.33	2764.21	3223.79	3357.44	3495.41	3637.89	3785.10	3937.27
CORPORATE TAX (21)										
NET PROFIT (22)	-920.93	737.49	1716.33	2764.21	3223.79	3357.44	3495.41	3637.89	3785.10	3937.27
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-920.93	737.49	1716.33	2764.21	3223.79	3357.44	3495.41	3637.89	3785.10	3937.27
ACCUMULATED UNDISTRICTED PROFITS	-920.93	-183.44	1532.89	4297.09	7520.88	10878.31	14373.72	18011.61	21796.71	25733.98
TOTAL INVESTMENT	3726.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	39.80									

ALTERNATE 1

EVALUATION - 1

We assume:

- Most likely values
- Current prices

Results:

- Rates of return on  
total investment ..... < 0,2%
- Pay-back period ..... >11 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	524.16	708.66	907.09	1120.26	1226.39	1275.44	1326.46	1379.52	1434.70	1492.09
2. TOTAL RAW MATERIAL COST	-464.62	-634.21	-819.60	-1021.94	-1129.51	-1185.98	-1245.28	-1307.55	-1372.93	-1441.57
3. OPERATING MARGIN (1+2)	59.54	74.45	87.49	98.32	96.88	89.46	81.18	71.97	61.77	50.51
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-40.60	-41.82	-43.08	-44.37	-45.70	-47.07	-48.48	-49.94	-51.43	-52.98
8. MAINTENANCE-REPAIR COST	-243.62	-250.92	-258.45	-266.21	-274.19	-282.42	-290.89	-299.62	-308.60	-317.86
9. MARKETING COST	-15.72	-21.26	-27.21	-33.61	-36.79	-38.26	-39.79	-41.39	-43.04	-44.74
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1491.48	-1621.35	-1759.87	-1907.58	-2017.87	-2109.68	-2205.80	-2306.44	-2411.83	-2522.18
11. INDUSTRIAL MARGIN (3+10)	-1431.95	-1546.90	-1672.38	-1809.26	-1920.99	-2020.22	-2124.62	-2234.47	-2350.06	-2471.66
12. DEPRECIATION COST-A (EQUIPMENT)	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00
13. DEPRECIATION COST-B (BUILDINGS)	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	7884.00	7884.00	7884.00	7884.00	7313.38	6702.81	6049.50	5350.46	4602.49	3802.16
15. INTEREST COST	1655.64	551.88	551.88	551.88	511.94	469.20	423.47	374.53	322.17	266.15
16. AMORTIZATION FEE				1122.50	1122.50	1122.50	1122.50	1122.50	1122.50	1122.50
17. AMORTIZATION OF LOAN				570.62	610.57	653.31	699.04	747.97	800.33	856.35
18. ACUMULATED AMORTIZATION OF LOAN				570.62	1181.19	1834.50	2533.54	3281.51	4081.84	4938.19
19. PRODUCTION COSTS (2+10+12+13-15)	-4266.45	-3462.14	-3786.05	-4136.10	-4314.01	-4419.56	-4529.25	-4643.22	-4761.63	-4884.60
20. GROSS PROFIT (1+19)	-3742.29	-2753.48	-2878.96	-3015.84	-3087.63	-3144.12	-3202.79	-3263.71	-3326.93	-3392.52
21. CORPORATE TAX										
22. NET PROFIT	-3742.29	-2753.48	-2878.96	-3015.84	-3087.63	-3144.12	-3202.79	-3263.71	-3326.93	-3392.52



	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	-1431.95	-1546.90	-1672.38	-1809.26	-1920.99	-2020.22	-2124.62	-2234.47	-2350.06	-2471.66
INTEREST COST (15)	1655.64	551.88	551.88	551.88	511.94	469.20	423.47	374.53	322.17	266.15
AMORTIZATION OF LOAN (17)				570.62	610.57	653.31	699.04	747.97	800.33	856.35
A. WORKING CAPITAL	1413.61	1180.74	1326.52	1483.71	1562.98	1607.19	1653.12	1700.83	1750.38	1801.84
B. CASH FLOW (11-15-17)	-3087.59	-2098.78	-2224.26	-2931.77	-3043.49	-3142.72	-3247.13	-3356.98	-3472.56	-3594.17
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2997.66	-1978.30	-2035.51	-2604.84	-2625.34	-2631.98	-2640.21	-2650.03	-2661.43	-2674.40
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2997.66	-4975.95	-7011.47	-9616.30	-12241.65	-14873.63	-17513.84	-20163.87	-22825.30	-25499.70
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	524.14	708.66	907.09	1120.26	1226.39	1275.44	1326.46	1379.52	1434.70	1492.09
PRODUCTION COSTS (19)	-4266.45	-3462.14	-3786.05	-4136.10	-4314.01	-4419.56	-4529.25	-4643.22	-4761.63	-4884.60
GROSS PROFIT (20)	-3742.29	-2753.48	-2878.96	-3015.84	-3087.63	-3144.12	-3202.79	-3263.71	-3326.93	-3392.52
CORPORATE TAX (21)										
NET PROFIT (22)	-3742.29	-2753.48	-2878.96	-3015.84	-3087.63	-3144.12	-3202.79	-3263.71	-3326.93	-3392.52
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3742.29	-2753.48	-2878.96	-3015.84	-3087.63	-3144.12	-3202.79	-3263.71	-3326.93	-3392.52
ACUMULATED UNDISTRICTED PROFITS	-3742.29	-6495.76	-9374.72	-12390.56	-15478.19	-18622.31	-21825.10	-25088.80	-28415.73	-31808.25
TOTAL INVESTMENT	7884.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE 1

EVALUATION - 2

We assume:

- All variables as in Evaluation 1.
- 10% increase in sales

Results:

- Rates of return on  
total investment ..... <0,2%
- Pay-back period ..... >11 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	576.68	779.67	997.98	1232.50	1349.27	1403.24	1459.37	1517.74	1578.45	1641.59
2. TOTAL RAW MATERIAL COST	-464.62	-634.21	-819.60	-1021.94	-1129.51	-1185.98	-1245.28	-1307.55	-1372.93	-1441.57
3. OPERATING MARGIN (1+2)	112.06	145.46	178.38	210.57	219.76	217.25	214.08	210.20	205.53	200.02
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-40.60	-41.82	-43.08	-44.37	-45.70	-47.07	-48.48	-49.94	-51.43	-52.98
8. MAINTENANCE-REPAIR COST	-243.62	-250.92	-258.45	-266.21	-274.19	-282.42	-290.89	-299.62	-308.60	-317.86
9. MARKETING COST	-17.30	-23.39	-29.94	-36.98	-40.48	-42.10	-43.78	-45.53	-47.35	-49.25
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1493.06	-1623.48	-1762.60	-1910.95	-2021.55	-2113.51	-2209.79	-2310.59	-2416.14	-2526.66
11. INDUSTRIAL MARGIN (3+10)	-1381.00	-1478.02	-1584.22	-1700.38	-1801.79	-1896.26	-1995.70	-2100.40	-2210.61	-2326.64
12. DEPRECIATION COST-A (EQUIPMENT)	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00
13. DEPRECIATION COST-B (BUILDINGS)	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	7884.00	7884.00	7884.00	7884.00	7313.38	6702.81	6049.50	5350.46	4602.49	3802.16
15. INTEREST COST	1655.64	551.88	551.88	551.88	511.94	469.20	423.47	374.53	322.17	266.15
16. AMORTIZATION FEE				1122.50	1122.50	1122.50	1122.50	1122.50	1122.50	1122.50
17. AMORTIZATION OF LOAN				570.62	610.57	653.31	699.04	747.97	800.33	856.35
18. ACUMULATED AMORTIZATION OF LOAN				570.62	1181.19	1834.50	2533.54	3281.51	4081.84	4938.19
19. PRODUCTION COSTS (2+10+12+13-15)	-4268.02	-3464.27	-3788.78	-4139.47	-4317.70	-4423.39	-4533.24	-4647.37	-4765.94	-4889.09
20. GROSS PROFIT (1+19)	-3491.34	-2684.60	-2790.80	-2906.96	-2968.43	-3020.15	-3073.87	-3129.63	-3187.49	-3247.50
21. CORPORATE TAX										
22. NET PROFIT	-3491.34	-2684.60	-2790.80	-2906.96	-2968.43	-3020.15	-3073.87	-3129.63	-3187.49	-3247.50

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	-1381.00	-1478.02	-1584.22	-1700.38	-1801.79	-1896.26	-1995.70	-2100.40	-2210.61	-2326.64
INTEREST COST (15)	1655.64	551.88	551.88	551.88	511.94	469.20	423.47	374.53	322.17	266.15
AMORTIZATION OF LOAN (17)				570.62	610.57	653.31	699.04	747.97	800.33	856.35
A. WORKING CAPITAL	1427.27	1199.21	1350.15	1512.90	1594.93	1640.42	1687.68	1736.77	1787.76	1840.71
B. CASH FLOW (11-15-17)	-3036.64	-2029.90	-2136.10	-2622.89	-2924.30	-3018.76	-3118.21	-3222.90	-3333.12	-3449.15
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2948.20	-1913.37	-1954.83	-2508.10	-2522.53	-2528.16	-2535.39	-2544.19	-2554.56	-2566.49
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2948.20	-4861.57	-6816.40	-9324.50	-11847.03	-14375.19	-16910.58	-19454.76	-22009.32	-24575.81
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	576.68	779.67	997.98	1232.50	1349.27	1403.24	1459.37	1517.74	1578.45	1641.59
PRODUCTION COSTS (19)	-4268.02	-3464.27	-3788.78	-4139.47	-4317.70	-4423.39	-4533.24	-4647.37	-4765.94	-4889.09
GROSS PROFIT (20)	-3691.34	-2684.60	-2790.80	-2906.96	-2968.43	-3020.15	-3073.87	-3129.63	-3187.49	-3247.50
CORPORATE TAX (21)										
NET PROFIT (22)	-3691.34	-2684.60	-2790.80	-2906.96	-2968.43	-3020.15	-3073.87	-3129.63	-3187.49	-3247.50
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3691.34	-2684.60	-2790.80	-2906.96	-2968.43	-3020.15	-3073.87	-3129.63	-3187.49	-3247.50
ACUMULATED UNDISTRICTED PROFITS	-3691.34	-6375.94	-9166.74	-12073.70	-15042.13	-18062.28	-21136.15	-24265.78	-27453.27	-30700.76
TOTAL INVESTMENT	7884.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE 1

EVALUATION - 3

We assume:

- All variables as in Evaluation 1.
- 5% increase in sales

Results:

- Rates of return on  
total investment ..... <0,2%
- Pay-back period ..... >11 years

	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
*****										
PRODUCTION COSTS AND										
NET INCOME STATEMENT										
IN THOUSAND DOLLARS										
*****										
1. TOTAL SALES	550.16	743.82	952.08	1175.82	1287.22	1338.71	1392.26	1447.95	1505.86	1566.10
2. TOTAL RAW MATERIAL COST	-464.62	-634.21	-819.60	-1021.94	-1129.51	-1185.98	-1245.28	-1307.55	-1372.93	-1441.57
3. OPERATING MARGIN (1+2)	85.54	109.60	132.49	153.89	157.71	152.72	146.97	140.40	132.94	124.53
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-494.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-40.60	-41.82	-43.08	-44.37	-45.70	-47.07	-48.48	-49.94	-51.43	-52.98
8. MAINTENANCE-REPAIR COST	-243.62	-250.92	-258.45	-266.21	-274.19	-282.42	-290.89	-299.62	-308.60	-317.86
9. MARKETING COST	-16.50	-22.31	-28.56	-35.27	-38.62	-40.16	-41.77	-43.44	-45.18	-46.98
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1492.26	-1622.40	-1761.22	-1909.25	-2019.69	-2111.57	-2207.77	-2308.50	-2413.96	-2524.40
11. INDUSTRIAL MARGIN (3+10)	-1406.73	-1512.80	-1628.73	-1755.36	-1861.98	-1958.85	-2060.80	-2168.10	-2281.02	-2399.87
12. DEPRECIATION COST-A (EQUIPMENT)	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00
13. DEPRECIATION COST-B (BUILDINGS)	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70
BANK LOANS										
14. OUTSTANDING BALANCE OF LOAN	7884.00	7884.00	7884.00	7884.00	7313.38	6702.81	6049.50	5350.46	4602.49	3802.16
15. INTEREST COST	1455.64	551.88	551.88	551.88	511.94	469.20	423.47	374.53	322.17	266.15
16. AMORTIZATION FEE				1122.50	1122.50	1122.50	1122.50	1122.50	1122.50	1122.50
17. AMORTIZATION OF LOAN				570.62	610.57	653.31	699.04	747.97	800.33	856.35
18. ACUMULATED AMORTIZATION OF LOAN				570.62	1181.19	1834.50	2533.54	3281.51	4081.84	4938.19
19. PRODUCTION COSTS (2+10+12+13-15)	-4267.23	-3463.19	-3787.40	-4137.77	-4315.84	-4421.46	-4771.22	-4645.28	-4763.76	-4886.82
20. GROSS PROFIT (1+19)	-3717.07	-2719.38	-2835.31	-2961.94	-3028.62	-3082.75	-3138.97	-3197.33	-3257.90	-3320.72
21. CORPORATE TAX										
22. NET PROFIT	-3717.07	-2719.38	-2835.31	-2961.94	-3028.62	-3082.75	-3138.97	-3197.33	-3257.90	-3320.72

	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
CASH FLOW TABLES										
***** INDUSTRIAL MARGIN (11)	-1406.73	-1512.80	-1628.73	-1755.36	-1861.98	-1958.85	-2060.80	-2168.10	-2281.02	-2399.87
INTEREST COST (15)	1655.64	551.88	551.88	551.88	511.94	469.20	423.47	374.53	322.17	266.15
AMORTIZATION OF LOAN (17)				570.62	610.57	653.31	699.04	747.97	800.33	856.35
A. WORKING CAPITAL	1420.37	1189.88	1338.21	1498.16	1578.80	1623.64	1670.23	1718.62	1768.89	1821.08
B. CASH FLOW (11-15-17)	-3062.37	-2064.68	-2180.61	-2877.87	-2984.49	-3081.36	-3183.31	-3290.60	-3403.53	-3522.38
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2973.17	-1946.16	-1995.57	-2556.95	-2574.44	-2580.59	-2588.32	-2597.63	-2608.52	-2620.98
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2973.17	-4919.33	-6914.90	-9471.85	-12046.29	-14626.88	-17215.20	-19812.83	-22421.35	-25042.33
F. PAY OUT TIME	11.00									
NET INCOME STATEMENT										
TOTAL SALES (1)	550.16	743.82	952.08	1175.82	1287.22	1338.71	1392.26	1447.95	1505.86	1566.10
PRODUCTION COSTS (19)	-4267.23	-3463.19	-3787.40	-4137.77	-4315.84	-4421.46	-4531.22	-4645.28	-4763.76	-4886.82
GROSS PROFIT (20)	-3717.07	-2719.38	-2835.31	-2961.94	-3028.62	-3082.75	-3138.97	-3197.33	-3257.90	-3320.72
CORPORATE TAX (21)										
NET PROFIT (22)	-3717.07	-2719.38	-2835.31	-2961.94	-3028.62	-3082.75	-3138.97	-3197.33	-3257.90	-3320.72
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3717.07	-2719.38	-2835.31	-2961.94	-3028.62	-3082.75	-3138.97	-3197.33	-3257.90	-3320.72
ACUMULATED UNDISTIBUTED PROFITS	-3717.07	-6436.44	-9271.76	-12233.70	-15262.32	-18345.07	-21484.03	-24681.37	-27939.26	-31259.99
TOTAL INVESTMENT	7884.00									
RATIOS										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE 1

EVALUATION - 4

We assume:

- All variables as in Evaluation 1.
- 5% decrease in sales

Results:

- Rates of return on  
total investment ..... <0,2%
- Pay-back period ..... >11 years



	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
*****										
PRODUCTION COSTS AND										
NET INCOME STATEMENT										
IN THOUSAND DOLLARS										
*****										
1. TOTAL SALES	498.16	673.51	862.10	1064.69	1165.55	1212.18	1260.66	1311.09	1363.53	1418.07
2. TOTAL RAW MATERIAL COST	-464.62	-634.21	-819.60	-1021.94	-1129.51	-1185.98	-1245.28	-1307.55	-1372.93	-1441.57
3. OPERATING MARGIN (1+2)	33.54	39.30	42.50	42.75	36.04	26.19	15.38	3.54	-9.39	-23.50
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-40.60	-41.82	-43.08	-44.37	-45.70	-47.07	-48.48	-49.94	-51.43	-52.98
8. MAINTENANCE-REPAIR COST	-243.62	-250.92	-258.45	-266.21	-274.19	-282.42	-290.89	-299.62	-308.60	-317.86
9. MARKETING COST	-14.94	-20.21	-25.86	-31.94	-34.97	-36.37	-37.82	-39.33	-40.91	-42.54
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1490.70	-1620.29	-1758.52	-1905.92	-2016.04	-2107.78	-2203.83	-2304.39	-2409.69	-2519.96
11. INDUSTRIAL MARGIN (3+10)	-1457.17	-1580.99	-1716.02	-1863.17	-1980.00	-2081.59	-2188.45	-2300.85	-2419.09	-2543.46
12. DEPRECIATION COST-A (EQUIPMENT)	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00
13. DEPRECIATION COST-B (BUILDINGS)	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70
BANK LOANS										
14. OUTSTANDING BALANCE OF LOAN	7884.00	7884.00	7884.00	7884.00	7313.38	6702.81	6049.50	5350.46	4602.49	3802.16
15. INTEREST COST	1455.64	551.88	551.88	551.88	511.94	469.20	423.47	374.53	322.17	266.15
16. AMORTIZATION FEE				1122.50	1122.50	1122.50	1122.50	1122.50	1122.50	1122.50
17. AMORTIZATION OF LOAN				570.62	610.57	653.31	699.04	747.97	800.33	856.35
18. ACUMULATED AMORTIZATION OF LOAN				570.62	1181.19	1834.50	2533.54	3281.51	4081.84	4938.19
19. PRODUCTION COSTS (2+10+12+13-15)	-4265.67	-3461.08	-3784.70	-4134.43	-4312.19	-4417.66	-4527.27	-4641.17	-4759.49	-4882.38
20. GROSS PROFIT (1+19)	-3767.51	-2787.57	-2922.60	-3069.75	-3146.63	-3205.48	-3266.61	-3330.08	-3395.96	-3464.31
21. CORPORATE TAX										
22. NET PROFIT	-3767.51	-2787.57	-2922.60	-3069.75	-3146.63	-3205.48	-3266.61	-3330.08	-3395.96	-3464.31

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	-1457.17	-1580.99	-1716.02	-1863.17	-1980.00	-2081.59	-2188.45	-2300.85	-2419.09	-2543.46
INTEREST COST (15)	1655.64	551.88	551.88	551.88	511.94	469.20	423.47	374.53	322.17	266.15
AMORTIZATION OF LOAN (17)				570.62	610.57	653.31	699.04	747.97	800.33	856.35
A. WORKING CAPITAL	1406.85	1171.60	1314.82	1469.27	1547.17	1590.74	1636.01	1683.04	1731.88	1782.59
B. CASH FLOW (11-15-17)	-3112.81	-2132.87	-2267.90	-2985.67	-3102.50	-3204.09	-3310.95	-3423.35	-3541.59	-3665.96
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-3022.14	-2010.44	-2075.45	-2652.73	-2676.25	-2683.38	-2692.11	-2702.43	-2714.33	-2727.82
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-3022.14	-5032.58	-7108.03	-9760.76	-12437.01	-15120.38	-17812.49	-20514.92	-23229.25	-25957.07
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	498.16	673.51	862.10	1064.69	1165.55	1212.18	1260.66	1311.05	1363.53	1418.07
PRODUCTION COSTS (19)	-4265.67	-3461.08	-3784.70	-4134.43	-4312.19	-4417.66	-4527.27	-4641.17	-4759.49	-4882.38
GROSS PROFIT (20)	-3767.51	-2787.57	-2922.60	-3069.75	-3146.63	-3205.48	-3266.61	-3330.08	-3395.96	-3464.31
CORPORATE TAX (21)										
NET PROFIT (22)	-3767.51	-2787.57	-2922.60	-3069.75	-3146.63	-3205.48	-3266.61	-3330.08	-3395.96	-3464.31
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3767.51	-2787.57	-2922.60	-3069.75	-3146.63	-3205.48	-3266.61	-3330.08	-3395.96	-3464.31
ACUMULATED UNDISTRICTED PROFITS	-3767.51	-6555.08	-9477.68	-12547.43	-15694.06	-18899.55	-22166.16	-25496.24	-28892.20	-32356.51
TOTAL INVESTMENT	7884.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE 1

EVALUATION - 5

We assume:

- All variables as in Evaluation 1.
- 10% decrease in sales

Results:

- Rates of return on  
total investment ..... <0,2%
- Pay-back period ..... >11 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	471.64	637.66	816.20	1008.01	1103.50	1147.64	1193.55	1241.29	1290.94	1342.58
2. TOTAL RAW MATERIAL COST	-412.18	-562.62	-727.08	-906.58	-1002.01	-1052.11	-1104.71	-1159.95	-1217.95	-1278.85
3. OPERATING MARGIN (1+2)	59.46	75.03	89.12	101.43	101.50	95.54	88.84	81.34	73.00	63.74
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.75	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-40.60	-41.82	-43.08	-44.37	-45.70	-47.07	-48.48	-49.94	-51.43	-52.98
8. MAINTENANCE-REPAIR COST	-243.62	-250.92	-258.45	-266.21	-274.19	-282.42	-290.89	-299.62	-308.60	-317.86
9. MARKETING COST	-14.15	-19.13	-24.49	-30.24	-33.11	-34.43	-35.81	-37.24	-38.73	-40.28
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1489.90	-1619.22	-1757.14	-1904.22	-2014.18	-2105.84	-2201.81	-2302.30	-2407.52	-2517.69
11. INDUSTRIAL MARGIN (3+10)	-1430.44	-1544.18	-1668.02	-1802.79	-1912.68	-2010.31	-2112.98	-2220.96	-2334.52	-2453.96
12. DEPRECIATION COST-A (EQUIPMENT)	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00
13. DEPRECIATION COST-B (BUILDINGS)	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	7884.00	7884.00	7884.00	7884.00	7313.38	6702.81	6049.50	5350.46	4602.49	3802.16
15. INTEREST COST	1655.64	551.88	551.88	551.88	511.94	469.20	423.47	374.53	322.17	266.15
16. AMORTIZATION FEE				1122.50	1122.50	1122.50	1122.50	1122.50	1122.50	1122.50
17. AMORTIZATION OF LOAN				570.62	610.57	653.31	699.04	747.97	800.33	856.35
18. ACCUMULATED AMORTIZATION OF LOAN				570.62	1181.19	1834.50	2533.54	3281.51	4081.84	4938.19
19. PRODUCTION COSTS (2+10+12+13-15)	-4212.42	-3388.42	-3690.81	-4017.38	-4182.83	-4281.85	-4384.69	-4491.48	-4602.34	-4717.39
20. GROSS PROFIT (1+19)	-3740.78	-2750.76	-2874.60	-3009.37	-3079.32	-3134.20	-3191.14	-3250.19	-3311.39	-3374.81
21. CORPORATE TAX										
22. NET PROFIT	-3740.78	-2750.76	-2874.60	-3009.37	-3079.32	-3134.20	-3191.14	-3250.19	-3311.39	-3374.81

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	-1430.44	-1544.18	-1668.02	-1802.79	-1912.68	-2010.31	-2112.98	-2220.96	-2334.52	-2453.96
INTEREST COST (15)	1655.64	551.88	551.88	551.88	511.94	469.20	423.47	374.53	322.17	266.15
AMORTIZATION OF LOAN (17)				570.62	610.57	653.31	699.04	747.97	800.33	856.35
A. WORKING CAPITAL	1382.48	1138.42	1272.05	1416.08	1488.53	1529.34	1571.71	1615.69	1661.35	1708.72
B. CASH FLOW (11-15-17)	-3086.08	-2096.06	-2219.90	-2925.29	-3035.19	-3132.81	-3235.48	-3343.46	-3457.02	-3576.46
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2996.20	-1975.74	-2031.53	-2599.08	-2618.18	-2623.68	-2630.74	-2639.36	-2649.52	-2661.22
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2996.20	-4971.94	-7003.46	-9602.55	-12220.73	-14844.41	-17475.15	-20114.51	-22764.03	-25425.25
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	471.64	637.66	816.20	1008.01	1103.50	1147.64	1193.55	1241.29	1290.94	1342.58
PRODUCTION COSTS (19)	-4212.42	-3388.42	-3690.81	-4017.38	-4182.83	-4281.85	-4384.69	-4491.48	-4602.34	-4717.39
GROSS PROFIT (20)	-3740.78	-2750.76	-2874.60	-3009.37	-3079.32	-3134.20	-3191.14	-3250.19	-3311.39	-3374.81
CORPORATE TAX (21)										
NET PROFIT (22)	-3740.78	-2750.76	-2874.60	-3009.37	-3079.32	-3134.20	-3191.14	-3250.19	-3311.39	-3374.81
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3740.78	-2750.76	-2874.60	-3009.37	-3079.32	-3134.20	-3191.14	-3250.19	-3311.39	-3374.81
ACUMULATED UNDISTRICTED PROFITS	-3740.78	-6491.54	-9366.15	-12375.52	-15454.84	-18589.04	-21780.18	-25030.37	-28341.76	-31716.57
TOTAL INVESTMENT	7884.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE 1

EVALUATION - 6

We assume:

- All variables as in Evaluation 1.
- 10% increase in investment

Results:

- Rates of return on  
total investment ..... < 0,2%
- Pay-back period ..... > 11 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	524.16	708.66	907.09	1120.26	1226.39	1275.44	1326.46	1379.52	1434.70	1492.09
2. TOTAL RAW MATERIAL COST	-464.62	-634.21	-819.60	-1021.94	-1129.51	-1185.98	-1245.28	-1307.55	-1372.93	-1441.57
3. OPERATING MARGIN (1+2)	59.54	74.45	87.49	98.32	96.88	89.46	81.18	71.97	61.77	50.51
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-44.64	-46.00	-47.38	-48.80	-50.27	-51.77	-53.33	-54.93	-56.57	-58.27
8. MAINTENANCE-REPAIR COST	-267.96	-276.00	-284.28	-292.81	-301.60	-310.64	-319.96	-329.56	-339.45	-349.63
9. MARKETING COST	-15.72	-21.26	-27.21	-33.61	-36.79	-38.26	-39.79	-41.39	-43.04	-44.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1519.89	-1650.61	-1790.01	-1938.63	-2049.84	-2142.61	-2239.72	-2341.38	-2447.91	-2559.24
11. INDUSTRIAL MARGIN (3+10)	-1460.35	-1576.15	-1702.52	-1840.31	-1952.96	-2053.15	-2158.54	-2269.41	-2386.04	-2508.73
12. DEPRECIATION COST-A (EQUIPMENT)	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10
13. DEPRECIATION COST-B (BUILDINGS)	-147.05	-147.05	-147.05	-147.05	-147.05	-147.05	-147.05	-147.05	-147.05	-147.05
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	8672.00	8672.00	8672.00	8672.00	8044.34	7372.75	6654.14	5885.24	5062.50	4182.18
15. INTEREST COST	1821.12	607.04	607.04	607.04	563.10	516.09	465.79	411.97	354.38	292.75
16. AMORTIZATION FEE				1234.70	1234.70	1234.70	1234.70	1234.70	1234.70	1234.70
17. AMORTIZATION OF LOAN				627.66	671.59	718.61	768.91	822.73	880.32	941.94
18. ACUMULATED AMORTIZATION OF LOAN				627.66	1299.25	2017.86	2786.76	3609.50	4489.82	5431.76
19. PRODUCTION COSTS (2+10+12+13-15)	-4525.78	-3612.01	-3936.80	-4287.75	-4462.60	-4564.84	-4670.94	-4781.05	-4895.26	-5013.72
20. GROSS PROFIT (1+19)	-4001.62	-2903.34	-3029.71	-3167.50	-3236.22	-3289.39	-3344.48	-3401.53	-3460.57	-3521.63
21. CORPORATE TAX										
22. NET PROFIT	-4001.62	-2903.34	-3029.71	-3167.50	-3236.22	-3289.39	-3344.48	-3401.53	-3460.57	-3521.63

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	-1460.35	-1576.15	-1702.52	-1840.31	-1952.96	-2053.15	-2158.54	-2269.41	-2386.04	-2508.73
INTEREST COST (15)	1821.12	607.04	607.04	607.04	563.10	516.09	465.79	411.97	354.38	292.75
AMORTIZATION OF LOAN (17)				627.66	671.59	718.61	768.91	822.73	880.32	941.94
A. WORKING CAPITAL	1489.15	1219.79	1365.86	1523.36	1601.61	1644.71	1689.44	1735.86	1784.02	1833.97
B. CASH FLOW (11-15-17)	-3281.47	-2183.19	-2309.56	-3075.00	-3187.66	-3287.85	-3393.24	-3504.11	-3620.74	-3743.43
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-3185.90	-2057.87	-2113.57	-2732.10	-2749.70	-2753.52	-2759.02	-2766.18	-2774.99	-2785.46
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-3185.90	-5243.77	-7357.34	-10089.44	-12839.14	-15592.66	-18351.68	-21117.86	-23892.85	-26678.31
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	524.16	708.66	907.09	1120.26	1226.39	1275.44	1326.46	1379.52	1434.70	1492.09
PRODUCTION COSTS (19)	-4525.78	-3612.01	-3936.80	-4287.75	-4462.60	-4564.84	-4670.94	-4781.05	-4895.26	-5013.72
GROSS PROFIT (20)	-4001.62	-2903.34	-3029.71	-3167.50	-3236.22	-3289.39	-3344.48	-3401.53	-3460.57	-3521.63
CORPORATE TAX (21)										
NET PROFIT (22)	-4001.62	-2903.34	-3029.71	-3167.50	-3236.22	-3289.39	-3344.48	-3401.53	-3460.57	-3521.63
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-4001.62	-2903.34	-3029.71	-3167.50	-3236.22	-3289.39	-3344.48	-3401.53	-3460.57	-3521.63
ACUMULATED UNDISTRIBUTED PROFITS	-4001.62	-6904.97	-9934.67	-13102.17	-16338.39	-19627.78	-22972.26	-26373.79	-29834.36	-33355.99
TOTAL INVESTMENT	8672.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									



ALTERNATE 1

EVALUATION - 7

We assume:

- All variables as in Evaluation 1.
- 10% decrease in investment

Results:

- Rates of return on  
total investment ..... <0,2%
- Pay-back period ..... >11 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>-----</b>										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
<b>*****</b>										
1. TOTAL SALES	524.16	708.66	907.09	1120.26	1226.39	1275.44	1326.46	1379.52	1434.70	1492.09
2. TOTAL RAW MATERIAL COST	-464.62	-634.21	-819.60	-1021.94	-1129.51	-1185.98	-1245.28	-1307.55	-1372.93	-1441.57
3. OPERATING MARGIN (1+2)	59.54	74.45	87.49	98.32	96.88	89.46	81.18	71.97	61.77	50.51
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-204.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-36.54	-37.64	-38.77	-39.93	-41.13	-42.36	-43.64	-44.95	-46.29	-47.68
8. MAINTENANCE-REPAIR COST	-219.27	-225.84	-232.62	-239.60	-246.79	-254.19	-261.82	-269.67	-277.76	-286.09
9. MARKETING COST	-15.72	-21.26	-27.21	-33.61	-36.79	-38.26	-39.79	-41.39	-43.04	-44.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1463.07	-1592.09	-1729.73	-1876.54	-1985.89	-2076.74	-2171.88	-2271.51	-2375.84	-2485.11
11. INDUSTRIAL MARGIN (3+10)	-1403.54	-1517.64	-1642.24	-1778.22	-1889.02	-1987.29	-2090.70	-2199.54	-2314.07	-2434.60
12. DEPRECIATION COST-A (EQUIPMENT)	-468.90	-468.90	-468.90	-468.90	-468.90	-468.90	-468.90	-468.90	-468.90	-468.90
13. DEPRECIATION COST-B (BUILDINGS)	-120.35	-120.35	-120.35	-120.35	-120.35	-120.35	-120.35	-120.35	-120.35	-120.35
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	7096.00	7096.00	7096.00	7096.00	6582.41	6032.87	5444.86	4815.69	4142.47	3422.14
15. INTEREST COST	1490.16	496.72	496.72	496.72	460.77	422.30	381.14	337.10	289.97	239.55
16. AMORTIZATION FEE				1010.31	1010.31	1010.31	1010.31	1010.31	1010.31	1010.31
17. AMORTIZATION OF LOAN				513.59	549.54	588.01	629.17	673.21	720.34	770.76
18. ACUMULATED AMORTIZATION OF LOAN				513.59	1063.13	1651.14	2280.31	2953.53	3673.86	4444.63
19. PRODUCTION COSTS (2+10+12+13-15)	-4007.11	-3312.27	-3635.30	-3984.45	-4165.42	-4274.28	-4387.55	-4505.40	-4627.99	-4755.48
20. GROSS PROFIT (1+19)	-3482.95	-2603.61	-2728.21	-2864.19	-2939.04	-2998.84	-3061.09	-3125.89	-3193.29	-3263.40
21. CORPORATE TAX										
22. NET PROFIT	-3482.95	-2603.61	-2728.21	-2864.19	-2939.04	-2998.84	-3061.09	-3125.89	-3193.29	-3263.40

	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
-----										
CASH FLOW TABLES										
*****										
INDUSTRIAL MARGIN (11)	-1403.54	-1517.64	-1642.24	-1778.22	-1889.02	-1987.29	-2090.70	-2199.54	-2314.07	-2434.60
INTEREST COST (15)	1490.16	496.72	496.72	496.72	460.77	422.30	381.14	337.10	289.97	239.55
AMORTIZATION OF LOAN (17)				513.59	549.54	588.01	629.17	673.21	720.34	770.76
A. WORKING CAPITAL	1338.08	1141.70	1287.17	1444.07	1524.36	1569.67	1616.80	1665.80	1716.75	1769.71
B. CASH FLOW (11-15-17)	-2893.70	-2014.36	-2138.96	-2788.53	-2899.33	-2997.60	-3101.01	-3209.85	-3324.38	-3444.91
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2809.42	-1898.72	-1957.45	-2477.58	-2500.99	-2510.44	-2521.41	-2533.88	-2547.86	-2563.34
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2809.42	-4708.14	-6665.59	-9143.17	-11644.15	-14154.60	-16676.00	-19209.89	-21757.75	-24321.08
F. PAY OUT TIME	11.00									
NET INCOME STATEMENT										
-----										
TOTAL SALES (1)	524.16	708.66	907.09	1120.26	1226.39	1275.44	1326.46	1379.52	1434.70	1492.09
PRODUCTION COSTS (19)	-4007.11	-3312.27	-3635.30	-3984.45	-4165.42	-4274.28	-4387.55	-4505.40	-4627.99	-4755.48
GROSS PROFIT (20)	-3482.95	-2603.61	-2728.21	-2864.19	-2939.04	-2998.84	-3061.09	-3125.89	-3193.29	-3263.40
CORPORATE TAX (21)										
NET PROFIT (22)	-3482.95	-2603.61	-2728.21	-2864.19	-2939.04	-2998.84	-3061.09	-3125.89	-3193.29	-3263.40
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3482.95	-2603.61	-2728.21	-2864.19	-2939.04	-2998.84	-3061.09	-3125.89	-3193.29	-3263.40
ACUMULATED UNDISTRICTED PROFITS	-3482.95	-6086.55	-8814.77	-11678.96	-14617.99	-17616.83	-20677.93	-23803.81	-26997.10	-30260.50
TOTAL INVESTMENT	7096.00									
RATIOS										
-----										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE 1

EVALUATION - 8

We assume:

- All variables as in Evaluation 1.
- 10% increase in salaries

Results:

- Rates of return on  
total investment ..... < 0,2%
- Pay-back period ..... >11 years

	1	2	3	4
<b>FOSTER WHEELER IBERIA</b>				
<b>-----</b>				
<b>PRODUCTION COSTS AND</b>				
<b>NET INCOME STATEMENT</b>				
<b>IN THOUSAND DOLLARS</b>				
<b>*****</b>				
1. TOTAL SALES	524.16	708.66	907.09	1120.26
2. TOTAL RAW MATERIAL COST	-464.62	-634.21	-819.60	-1021.94
3. OPERATING MARGIN (1+2)	59.54	74.45	87.49	98.32
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61
5. LABOUR COST				
CATEGOF	-169.05	-177.50	-186.38	-195.70
CATEGD	-544.95	-572.20	-600.81	-630.85
CATEG	-227.85	-239.24	-251.20	-263.76
CATEG	-105.00	-110.25	-115.76	-121.55
TOTAL L. COST	-1046.85	-1099.19	-1154.15	-1211.86
6. OVERHEAD COST	-52.34	-54.96	-57.71	-60.59
7. INSURANCE COST	-40.60	-41.82	-43.08	-44.37
8. MAINTENANCE-REPAIR COST	-243.62	-250.92	-258.45	-266.21
9. MARKETING COST	-15.72	-21.26	-27.21	-33.61
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1581.89	-1716.27	-1859.54	-2012.24
11. INDUSTRIAL MARGIN (3+10)	-1522.35	-1641.82	-1772.05	-1913.92
12. DEPRECIATION COST-A (EQUIPMENT)	-521.00	-521.00	-521.00	-521.00
13. DEPRECIATION COST-B (BUILDINGS)	-133.70	-133.70	-133.70	-133.70
<b>BANK LOANS</b>				
14. OUTSTANDING BALANCE OF LOAN	7884.00	7884.00	7884.00	7884.00
15. INTEREST COST	1655.64	551.88	551.88	551.88
16. AMORTIZATION FEE				1122.50
17. AMORTIZATION OF LOAN				570.62
18. ACUMULATED AMORTIZATION OF LOAN				570.62
19. PRODUCTION COSTS (2+10+12+13-15)	-4356.85	-3557.06	-3885.72	-4240.76
20. GROSS PROFIT (1+19)	-3832.69	-2848.40	-2978.63	-3120.50
21. CORPORATE TAX				
22. NET PROFIT	-3832.69	-2848.40	-2978.63	-3120.50

5	6	7	8	9	10
1226.39	1275.44	1326.46	1379.52	1434.70	1492.09
-1129.51	-1185.98	-1245.28	-1307.55	-1372.93	-1441.57
96.88	89.46	81.18	71.97	61.77	50.51
-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
-205.48	-215.76	-226.54	-237.87	-249.76	-262.25
-662.39	-695.51	-730.29	-766.80	-805.14	-845.40
-276.95	-290.80	-305.34	-320.61	-336.64	-353.47
-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
-1272.45	-1336.08	-1402.88	-1473.02	-1546.67	-1624.01
-63.62	-66.80	-70.14	-73.65	-77.33	-81.20
-45.70	-47.07	-48.48	-49.94	-51.43	-52.98
-274.19	-282.42	-290.89	-299.62	-308.60	-317.86
-36.79	-38.26	-39.79	-41.39	-43.04	-44.76
-2127.75	-2225.06	-2326.95	-2433.65	-2545.40	-2662.43
-2030.88	-2135.60	-2245.78	-2361.68	-2483.62	-2611.91
-521.00	-521.00	-521.00	-521.00	-521.00	-521.00
-133.70	-133.70	-133.70	-133.70	-133.70	-133.70
7313.38	6702.81	6049.50	5350.46	4602.49	3802.16
511.94	469.20	423.47	374.53	322.17	266.19
1122.50	1122.50	1122.50	1122.50	1122.50	1122.50
610.57	653.31	699.04	747.97	800.33	856.35
1181.19	1834.50	2533.54	3281.51	4081.84	4938.19
-4423.90	-4534.94	-4650.40	-4770.43	-4895.20	-5024.85
-3197.51	-3259.50	-3323.94	-3390.92	-3460.50	-3532.76
-3197.51	-3259.50	-3323.94	-3390.92	-3460.50	-3532.76

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	-1522.35	-1641.82	-1772.05	-1913.92	-2030.88	-2135.60	-2245.78	-2361.68	-2483.62	-2611.91
INTEREST COST (15)	1655.64	551.88	551.88	551.88	511.94	469.20	423.47	374.53	322.17	266.15
AMORTIZATION OF LOAN (17)				570.62	610.57	653.31	699.04	747.97	800.33	856.35
A. WORKING CAPITAL	1443.75	1212.39	1359.74	1518.60	1599.61	1645.65	1693.50	1743.23	1794.91	1848.59
B. CASH FLOW (11-15-17)	-3177.99	-2193.70	-2323.93	-3036.42	-3153.38	-3258.11	-3368.28	-3484.19	-3606.13	-3734.42
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-3085.43	-2067.77	-2126.73	-2697.82	-2720.14	-2728.61	-2738.72	-2750.45	-2763.80	-2778.76
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-3085.43	-5153.20	-7279.93	-9977.75	-12697.89	-15426.50	-18165.22	-20915.67	-23679.46	-26458.22
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	524.16	708.66	907.09	1120.26	1226.39	1275.44	1326.46	1379.52	1434.70	1492.09
PRODUCTION COSTS (19)	-4356.85	-3557.06	-3885.72	-4240.76	-4423.90	-4534.94	-4650.40	-4770.43	-4895.20	-5024.85
GROSS PROFIT (20)	-3832.69	-2848.40	-2978.63	-3120.50	-3197.51	-3259.50	-3323.94	-3390.92	-3460.50	-3532.76
CORPORATE TAX (21)										
NET PROFIT (22)	-3832.69	-2848.40	-2978.63	-3120.50	-3197.51	-3259.50	-3323.94	-3390.92	-3460.50	-3532.76
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3832.69	-2848.40	-2978.63	-3120.50	-3197.51	-3259.50	-3323.94	-3390.92	-3460.50	-3532.76
ACUMULATED UNDISTRICTED PROFITS	-3832.69	-6681.09	-9659.72	-12780.22	-15977.74	-19237.23	-22561.17	-25952.09	-29412.59	-32945.35
TOTAL INVESTMENT	7884.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE 1

EVALUATION - 9

We assume:

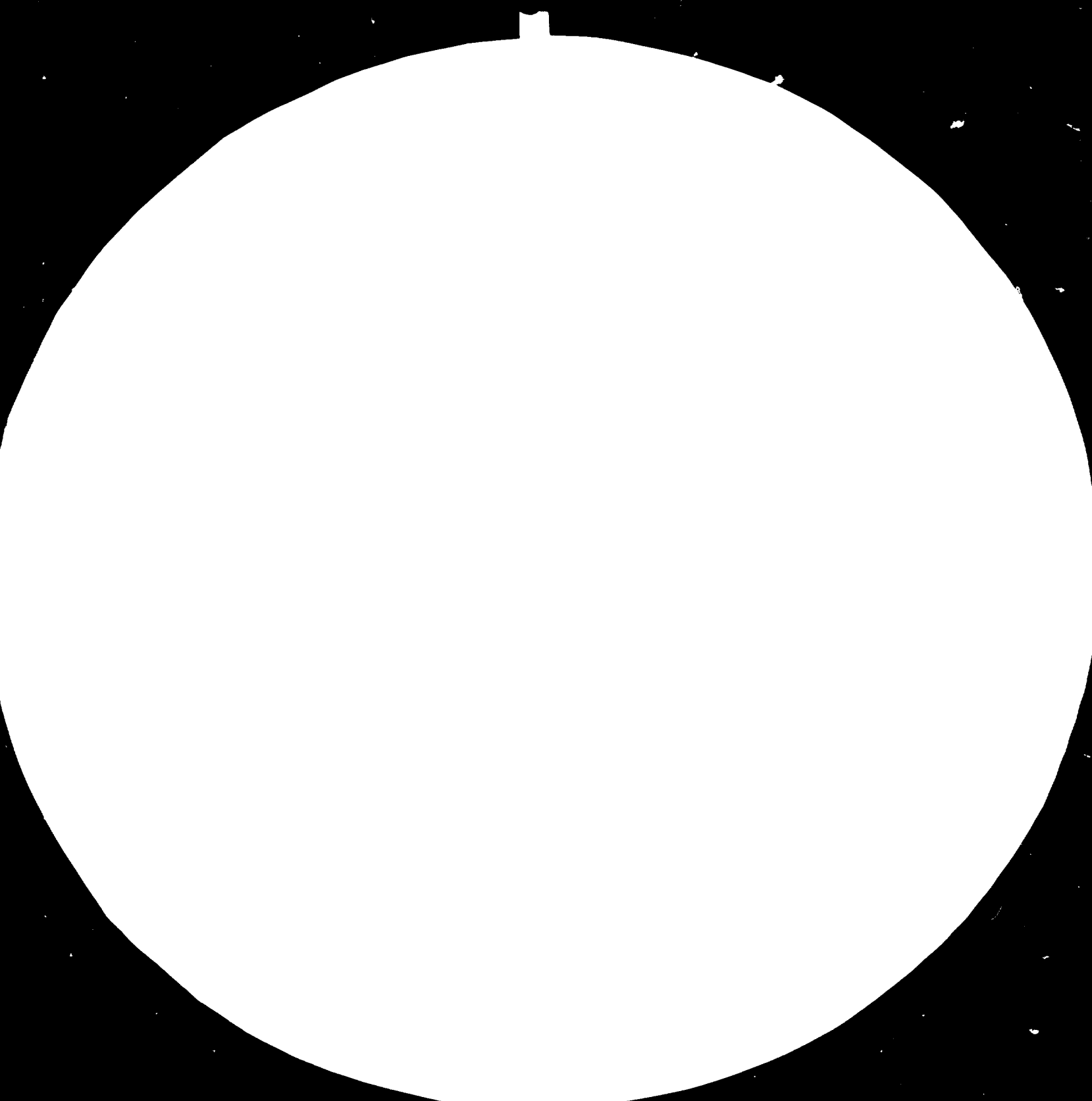
- All variables as in Evaluation 1.
  
- 10% decrease in salaries

Results:

- Rates of return on  
total investment ..... < 0,2%
  
- Pay-back period ..... > 11 years



	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	524.16	708.66	907.09	1120.26	1226.39	1275.44	1326.46	1379.52	1434.70	1492.09
2. TOTAL RAW MATERIAL COST	-444.62	-634.21	-819.60	-1021.94	-1129.51	-1185.98	-1245.28	-1307.55	-1372.93	-1441.57
3. OPERATING MARGIN (1+2)	59.54	74.45	87.49	98.32	96.88	89.46	81.18	71.97	61.77	50.51
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-137.55	-144.43	-151.65	-159.23	-167.19	-175.55	-184.33	-193.55	-203.22	-213.39
CATEGORY-B	-446.25	-468.56	-491.99	-516.59	-542.42	-569.54	-598.02	-627.92	-659.31	-692.28
CATEGORY-C	-185.85	-195.14	-204.90	-215.14	-225.90	-237.20	-249.06	-261.51	-274.59	-288.31
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-874.65	-918.38	-964.30	-1012.52	-1063.14	-1116.30	-1172.11	-1230.72	-1292.26	-1356.87
6. OVERHEAD COST	-43.73	-45.92	-48.22	-50.63	-53.16	-55.81	-58.61	-61.54	-64.61	-67.84
7. INSURANCE COST	-40.60	-41.82	-43.08	-44.37	-45.70	-47.07	-48.48	-49.94	-51.43	-52.98
8. MAINTENANCE-REPAIR COST	-243.62	-250.92	-258.45	-266.21	-274.19	-282.42	-290.89	-299.62	-308.60	-317.86
9. MARKETING COST	-15.72	-21.26	-27.21	-33.61	-36.79	-38.26	-39.79	-41.39	-43.04	-44.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1401.08	-1526.42	-1660.20	-1802.93	-1907.98	-1994.29	-2084.65	-2179.24	-2278.26	-2381.93
11. INDUSTRIAL MARGIN (3+10)	-1341.54	-1451.97	-1572.71	-1704.61	-1811.10	-1904.84	-2003.47	-2107.27	-2216.49	-2331.42
12. DEPRECIATION COST-A (EQUIPMENT)	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00
13. DEPRECIATION COST-B (BUILDINGS)	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	7884.00	7884.00	7884.00	7884.00	7313.38	6702.81	6049.50	5350.46	4602.49	3802.16
15. INTEREST COST	1655.64	551.88	551.88	551.88	511.94	469.20	423.47	374.53	322.17	266.15
16. AMORTIZATION FEE				1122.50	1122.50	1122.50	1122.50	1122.50	1122.50	1122.50
17. AMORTIZATION OF LOAN				570.62	610.57	653.31	699.04	747.97	800.33	856.35
18. ACUMULATED AMORTIZATION OF LOAN				570.62	1181.19	1834.50	2533.54	3281.51	4081.84	4938.19
19. PRODUCTION COSTS (2+10+12+13-15)	-4176.04	-3367.21	-3686.38	-4031.45	-4204.12	-4304.18	-4408.10	-4516.02	-4628.06	-4744.35
20. GROSS PROFIT (1+19)	-3651.88	-2658.55	-2779.29	-2911.19	-2977.74	-3028.73	-3081.64	-3136.50	-3193.36	-3252.27
21. CORPORATE TAX										
22. NET PROFIT	-3651.88	-2658.55	-2779.29	-2911.19	-2977.74	-3028.73	-3081.64	-3136.50	-3193.36	-3252.27





28

Resolution test pattern 2.5, consisting of five vertical lines on the left and five horizontal lines on the right, with the number 2.5 printed in the center.

32



36



40



# MICROCOPY RESOLUTION TEST CHART

NATIONAL BUREAU OF STANDARDS  
TAGUARD REFERENCE MATERIAL CENTER  
NBS 1963-108 MICROFILM TEST CHART NO. 1010

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	-1341.54	-1451.97	-1572.71	-1704.61	-1811.10	-1904.84	-2003.47	-2107.27	-2216.49	-2331.42
INTEREST COST (15)	1655.64	551.88	551.88	551.88	511.94	469.20	423.47	374.53	322.17	266.15
AMORTIZATION OF LOAN (17)				570.62	610.57	653.31	699.04	747.97	800.33	856.35
A. WORKING CAPITAL	1383.48	1149.10	1293.29	1448.83	1526.36	1568.73	1612.74	1658.43	1705.86	1755.09
B. CASH FLOW (11-15-17)	-2997.18	-2003.85	-2124.59	-2827.11	-2933.61	-3027.34	-3125.98	-3229.77	-3338.99	-3453.92
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2909.88	-1888.82	-1944.30	-2511.85	-2530.55	-2535.35	-2541.71	-2549.61	-2559.06	-2570.44
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2909.88	-4798.70	-6743.00	-9254.86	-11785.41	-14320.76	-16862.47	-19412.08	-21971.14	-24541.18
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	524.16	708.66	907.09	1120.26	1226.39	1275.44	1326.46	1379.52	1434.70	1492.09
PRODUCTION COSTS (19)	-4176.04	-3367.21	-3686.38	-4031.45	-4204.12	-4304.18	-4408.10	-4516.02	-4628.06	-4744.35
GROSS PROFIT (20)	-3651.88	-2658.55	-2779.29	-2911.19	-2977.74	-3028.73	-3081.64	-3136.50	-3193.36	-3252.27
CORPORATE TAX (21)										
NET PROFIT (22)	-3651.88	-2658.55	-2779.29	-2911.19	-2977.74	-3028.73	-3081.64	-3136.50	-3193.36	-3252.27
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3651.88	-2658.55	-2779.29	-2911.19	-2977.74	-3028.73	-3081.64	-3136.50	-3193.36	-3252.27
ACUMULATED UNDISTRICTED PROFITS	-3651.88	-6310.43	-9089.72	-12000.91	-14978.65	-18007.38	-21089.02	-24225.52	-27418.88	-30671.14
TOTAL INVESTMENT	7884.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE 1

EVALUATION - 10

We assume:

- All variables as in Evaluation 1.
- Loan interest 4%

Results:

- Rates of return on  
total investment ..... < 0,2%
- Pay-back period ..... > 11 years

	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
*****										
PRODUCTION COSTS AND										
NET INCOME STATEMENT										
IN THOUSAND DOLLARS										
*****										
1. TOTAL SALES	524.14	708.64	907.09	1120.26	1226.39	1275.44	1326.46	1379.52	1434.70	1492.09
2. TOTAL RAW MATERIAL COST	-464.62	-634.21	-819.60	-1021.94	-1129.51	-1185.98	-1245.28	-1307.55	-1372.93	-1441.57
3. OPERATING MARGIN (1+2)	59.54	74.45	87.49	98.32	96.88	89.46	81.18	71.97	61.77	50.51
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-706.85	-717.19	-728.05	-739.45	-751.43	-764.00	-777.20	-791.06	-805.61	-820.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-40.60	-41.82	-43.08	-44.37	-45.70	-47.07	-48.48	-49.94	-51.43	-52.98
8. MAINTENANCE-REPAIR COST	-243.62	-250.92	-258.45	-266.21	-274.19	-282.42	-290.89	-299.62	-308.60	-317.86
9. MARKETING COST	-15.72	-21.26	-27.21	-33.61	-36.79	-38.26	-39.79	-41.39	-43.04	-44.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1491.48	-1621.35	-1759.87	-1907.58	-2017.87	-2109.68	-2205.80	-2306.44	-2411.83	-2522.18
11. INDUSTRIAL MARGIN (3+10)	-1431.95	-1546.90	-1672.38	-1809.26	-1920.99	-2020.22	-2124.62	-2234.47	-2350.06	-2471.66
12. DEPRECIATION COST-A (EQUIPMENT)	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00
13. DEPRECIATION COST-B (BUILDINGS)	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70
BANK LOANS										
14. OUTSTANDING BALANCE OF LOAN	7884.00	7884.00	7884.00	7884.00	7227.33	6544.40	5834.15	5095.49	4327.29	3528.35
15. INTEREST COST	946.08	315.36	315.36	315.36	289.09	261.78	233.37	203.82	173.09	141.13
16. AMORTIZATION FEE				972.03	972.03	972.03	972.03	972.03	972.03	972.03
17. AMORTIZATION OF LOAN				656.67	682.93	710.25	738.66	768.21	798.93	830.89
18. ACUMULATED AMORTIZATION OF LOAN				656.67	1339.60	2049.85	2788.51	3556.71	4355.65	5186.54
19. PRODUCTION COSTS (2+10+12+13-15)	-3556.89	-3225.62	-3549.53	-3899.58	-4091.17	-4212.14	-4339.15	-4472.51	-4612.54	-4759.58
20. GROSS PROFIT (1+19)	-3032.73	-2516.96	-2642.44	-2779.32	-2864.78	-2936.70	-3012.69	-3092.99	-3177.85	-3267.50
21. CORPORATE TAX										
22. NET PROFIT	-3032.73	-2516.96	-2642.44	-2779.32	-2864.78	-2936.70	-3012.69	-3092.99	-3177.85	-3267.50

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLE</b>										
*****										
INDUSTRIAL MARGIN (11)	-1431.95	-1546.90	-1672.38	-1809.26	-1920.99	-2020.22	-2124.62	-2234.47	-2350.06	-2471.66
INTEREST COST (15)	946.08	315.36	315.36	315.36	289.09	261.78	233.37	203.82	173.09	141.13
AMORTIZATION OF LOAN (17)				656.67	682.93	710.25	738.66	768.21	798.93	830.89
A. WORKING CAPITAL	1177.09	1101.90	1247.68	1404.87	1488.70	1538.05	1589.75	1643.93	1700.69	1760.16
B. CASH FLOW (11-15-17)	-2378.03	-1862.26	-1987.74	-2781.29	-2893.02	-2992.24	-3096.65	-3206.50	-3322.08	-3443.69
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2308.76	-1755.35	-1819.06	-2471.14	-2495.54	-2505.96	-2517.86	-2531.24	-2546.10	-2562.43
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2308.76	-4064.12	-5883.18	-8354.32	-10849.86	-13355.82	-15873.68	-18404.92	-20951.02	-23513.45
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	524.16	708.66	907.09	1120.26	1226.39	1275.44	1326.46	1379.52	1434.70	1492.09
PRODUCTION COSTS (19)	-3556.89	-3225.62	-3549.53	-3899.58	-4091.17	-4212.14	-4339.15	-4472.51	-4612.54	-4759.58
GROSS PROFIT (20)	-3032.73	-2516.96	-2642.44	-2779.32	-2864.78	-2936.70	-3012.69	-3092.99	-3177.85	-3267.50
CORPORATE TAX (21)										
NET PROFIT (22)	-3032.73	-2516.96	-2642.44	-2779.32	-2864.78	-2936.70	-3012.69	-3092.99	-3177.85	-3267.50
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3032.73	-2516.96	-2642.44	-2779.32	-2864.78	-2936.70	-3012.69	-3092.99	-3177.85	-3267.50
ACUMULATED UNDISTRICTED PROFITS	-3032.73	-5549.68	-8192.12	-10971.44	-13836.23	-16772.92	-19785.61	-22878.61	-26056.45	-29323.95
TOTAL INVESTMENT	7884.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE 1

EVALUATION - 11

We assume:

- All variables as in Evaluation 1.
- Loan interest 10%

Results:

- Rates of return on  
total investment ..... < 0,2%
- Pay-back period ..... > 11 years



	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
*****										
PRODUCTION COSTS AND										
NET INCOME STATEMENT										
IN THOUSAND DOLLARS										
*****										
1. TOTAL SALES	524.16	708.66	907.09	1120.26	1226.39	1275.44	1326.46	1379.52	1434.70	1492.09
2. TOTAL RAW MATERIAL COST	-464.62	-634.21	-819.60	-1021.94	-1129.51	-1185.98	-1245.28	-1307.55	-1372.93	-1441.57
3. OPERATING MARGIN (1+2)	59.54	74.45	87.49	98.32	96.88	89.46	81.18	71.97	61.77	50.51
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.04	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-40.60	-41.82	-43.08	-44.37	-45.70	-47.07	-48.48	-49.94	-51.43	-52.98
8. MAINTENANCE-REPAIR COST	-243.62	-250.92	-258.45	-266.21	-274.19	-282.42	-290.89	-299.62	-308.60	-317.86
9. MARKETING COST	-15.72	-21.26	-27.21	-33.61	-36.79	-38.26	-39.79	-41.39	-43.04	-44.76
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1491.48	-1621.35	-1759.87	-1907.58	-2017.87	-2109.68	-2205.80	-2306.44	-2411.83	-2522.18
11. INDUSTRIAL MARGIN (3+10)	-1431.95	-1546.90	-1672.38	-1809.26	-1920.99	-2020.22	-2124.62	-2234.47	-2350.06	-2471.66
12. DEPRECIATION COST-A (EQUIPMENT)	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00	-521.00
13. DEPRECIATION COST-B (BUILDINGS)	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70	-133.70
BANK LOANS										
14. OUTSTANDING BALANCE OF LOAN	7884.00	7884.00	7884.00	7884.00	7389.32	6845.16	6246.59	5588.17	4863.90	4067.21
15. INTEREST COST	2365.20	788.40	788.40	788.40	738.93	684.52	624.66	558.82	486.39	406.72
16. AMORTIZATION FEE				1283.08	1283.08	1283.08	1283.08	1283.08	1283.08	1283.08
17. AMORTIZATION OF LOAN				494.68	544.15	598.57	658.43	724.27	796.69	876.36
18. ACUMULATED AMORTIZATION OF LOAN				494.68	1038.84	1637.41	2295.83	3020.10	3816.79	4693.16
19. PRODUCTION COSTS (2+10+12+13-15)	-4976.01	-3698.66	-4022.57	-4372.62	-4541.01	-4634.88	-4730.44	-4827.51	-4925.84	-5025.17
20. GROSS PROFIT (1+19)	-4451.85	-2990.00	-3115.48	-3252.36	-3314.62	-3359.44	-3403.98	-3447.99	-3491.15	-3533.08
21. CORPORATE TAX										
22. NET PROFIT	-4451.85	-2990.00	-3115.48	-3252.36	-3314.62	-3359.44	-3403.98	-3447.99	-3491.15	-3533.08

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
*****										
INDUSTRIAL MARGIN (11)	-1431.95	-1546.90	-1672.38	-1809.26	-1920.99	-2020.22	-2124.62	-2234.47	-2350.06	-2471.66
INTEREST COST (15)	2365.20	788.40	788.40	788.40	738.93	684.52	624.66	558.82	486.39	406.72
AMORTIZATION OF LOAN (17)				494.68	544.15	598.57	658.43	724.27	796.69	876.36
A. WORKING CAPITAL	1450.13	1259.58	1405.36	1562.55	1638.65	1678.96	1720.19	1762.26	1805.12	1848.69
B. CASH FLOW (11-15-17)	-3797.15	-2335.30	-2460.78	-3092.35	-3204.07	-3303.30	-3407.71	-3517.56	-3633.14	-3754.75
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-3686.55	-2201.24	-2251.96	-2747.51	-2763.86	-2766.46	-2770.78	-2776.79	-2784.50	-2793.89
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-3686.55	-5887.79	-8139.75	-10887.26	-13651.13	-16417.59	-19188.37	-21965.16	-24749.66	-27543.55
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	524.16	708.66	907.09	1120.26	1226.39	1275.44	1326.46	1379.52	1434.70	1492.09
PRODUCTION COSTS (19)	-4976.01	-3698.66	-4022.57	-4372.62	-4541.01	-4634.88	-4730.44	-4827.51	-4925.84	-5025.17
GROSS PROFIT (20)	-4451.85	-2990.00	-3115.48	-3252.36	-3314.62	-3359.44	-3403.98	-3447.99	-3491.15	-3533.08
CORPORATE TAX (21)										
NET PROFIT (22)	-4451.85	-2990.00	-3115.48	-3252.36	-3314.62	-3359.44	-3403.98	-3447.99	-3491.15	-3533.08
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-4451.85	-2990.00	-3115.48	-3252.36	-3314.62	-3359.44	-3403.98	-3447.99	-3491.15	-3533.08
ACUMULATED UNDISTRICTED PROFITS	-4451.85	-7441.84	-10557.32	-13809.68	-17124.31	-20483.74	-23887.72	-27335.72	-30826.86	-34359.95
TOTAL INVESTMENT	7884.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE - 2

EVALUATION - 1

We assume:

- Most likely values
- Current prices

Results:

- Rates of return on  
total investment ..... < 0,2%
- Pay-back period ..... > 11 years

	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
*****										
PRODUCTION COSTS AND										
NET INCOME STATEMENT										
IN THOUSAND DOLLARS										
*****										
1. TOTAL SALES	505.44	683.35	874.69	1080.25	1182.59	1229.89	1279.09	1330.25	1383.46	1438.80
2. TOTAL RAW MATERIAL COST	-475.12	-648.55	-838.12	-1045.03	-1155.03	-1212.79	-1273.43	-1337.10	-1403.95	-1474.15
3. OPERATING MARGIN (1+2)	30.32	34.81	36.57	35.22	27.55	17.10	5.66	-6.85	-20.49	-35.35
4. UTILITIES COST	-51.63	-69.13	-87.64	-107.19	-116.22	-119.70	-123.29	-126.99	-130.80	-134.73
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-33.17	-34.16	-35.19	-36.24	-37.33	-38.45	-39.60	-40.79	-42.01	-43.27
8. MAINTENANCE-REPAIR COST	-199.00	-204.97	-211.11	-217.45	-223.97	-230.69	-237.61	-244.74	-252.08	-259.64
9. MARKETING COST	-15.16	-20.50	-26.24	-32.41	-35.48	-36.90	-38.37	-39.91	-41.50	-43.16
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1307.74	-1387.99	-1472.37	-1561.09	-1639.18	-1713.24	-1790.75	-1871.90	-1956.84	-2045.77
11. INDUSTRIAL MARGIN (3+10)	-1277.43	-1353.18	-1435.79	-1525.87	-1611.63	-1696.13	-1785.09	-1878.74	-1977.33	-2081.12
12. DEPRECIATION COST-A (EQUIPMENT)	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50
13. DEPRECIATION COST-B (BUILDINGS)	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75
BANK LOANS										
14. OUTSTANDING BALANCE OF LOAN	6440.00	6440.00	6440.00	6440.00	5973.89	5475.15	4941.50	4370.49	3759.52	3105.77
15. INTEREST COST	1352.40	450.80	450.80	450.80	418.17	383.26	345.90	305.93	263.17	217.40
16. AMORTIZATION FEE				916.91	916.91	916.91	916.91	916.91	916.91	916.91
17. AMORTIZATION OF LOAN				466.11	498.74	533.65	571.01	610.98	653.74	699.51
18. ACUMULATED AMORTIZATION OF LOAN				466.11	964.85	1498.50	2069.51	2680.48	3334.23	4033.74
19. PRODUCTION COSTS (2+10+12+13-15)	-3677.52	-3029.58	-3303.54	-3599.17	-3754.64	-3851.53	-3952.33	-4057.18	-4166.21	-4279.57
20. GROSS PROFIT (1+19)	-3172.08	-2346.23	-2428.84	-2518.92	-2572.05	-2621.64	-2673.25	-2726.93	-2782.75	-2840.78
21. CORPORATE TAX										
22. NET PROFIT	-3172.08	-2346.23	-2428.84	-2518.92	-2572.05	-2621.64	-2673.25	-2726.93	-2782.75	-2840.78

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	-1277.43	-1353.18	-1435.79	-1525.87	-1611.63	-1696.13	-1785.09	-1878.74	-1977.33	-2081.12
INTEREST COST (15)	1352.40	450.80	450.80	450.80	418.17	383.26	345.90	305.93	263.17	217.40
AMORTIZATION OF LOAN (17)				466.11	498.74	533.65	571.01	610.98	653.74	699.51
A. WORKING CAPITAL	1253.22	1078.80	1214.87	1361.54	1437.45	1480.99	1526.29	1573.41	1622.43	1673.39
B. CASH FLOW (11-15-17)	-2629.83	-1803.98	-1886.59	-2442.78	-2528.54	-2613.04	-2702.00	-2795.66	-2894.25	-2998.03
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2553.23	-1700.42	-1726.50	-2170.38	-2181.14	-2188.38	-2196.98	-2206.92	-2218.20	-2230.82
E. ACCUMULATED CASH FLOW AT DEVALUATION RATE	-2553.23	-4253.65	-5980.15	-8150.53	-10331.67	-12520.05	-14717.03	-16923.95	-19142.15	-21372.96
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	505.44	683.35	874.69	1080.25	1182.59	1229.89	1279.09	1330.25	1383.46	1438.80
PRODUCTION COSTS (19)	-3677.52	-3029.58	-3303.54	-3599.17	-3754.64	-3851.53	-3952.33	-4057.18	-4166.21	-4279.57
GROSS PROFIT (20)	-3172.08	-2346.23	-2428.84	-2518.92	-2572.05	-2621.64	-2673.25	-2726.93	-2782.75	-2840.78
CORPORATE TAX (21)										
NET PROFIT (22)	-3172.08	-2346.23	-2428.84	-2518.92	-2572.05	-2621.64	-2673.25	-2726.93	-2782.75	-2840.78
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3172.08	-2346.23	-2428.84	-2518.92	-2572.05	-2621.64	-2673.25	-2726.93	-2782.75	-2840.78
ACCUMULATED UNDISTRICTED PROFITS	-3172.08	-5518.30	-7947.15	-10466.06	-13038.12	-15659.76	-18333.01	-21059.94	-23842.69	-26683.47
TOTAL INVESTMENT	6440.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE - 2

EVALUATION - 2

We assume:

- All variables as in Evaluation 1.
- 10% increase in sales.

Results:

- Rates of return on  
total investment .....  $< 0,2\%$
- Pay-back period .....  $> 11$  years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	555.88	751.55	961.98	1188.05	1300.60	1352.63	1406.73	1463.00	1521.52	1582.38
2. TOTAL RAW MATERIAL COST	-475.12	-648.55	-838.12	-1045.03	-1155.03	-1212.79	-1273.43	-1337.10	-1403.95	-1474.15
3. OPERATING MARGIN (1+2)	80.76	103.00	123.86	143.02	145.57	139.84	133.31	125.90	117.57	108.23
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-33.17	-34.16	-35.19	-36.24	-37.33	-38.45	-39.60	-40.79	-42.01	-43.27
8. MAINTENANCE-REPAIR COST	-199.00	-204.97	-211.11	-217.45	-223.97	-230.69	-237.61	-244.74	-252.08	-259.64
9. MARKETING COST	-16.68	-22.55	-28.86	-35.64	-39.02	-40.58	-42.20	-43.89	-45.65	-47.47
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1440.38	-1569.01	-1706.29	-1852.73	-1961.50	-2051.64	-2146.05	-2244.93	-2348.49	-2456.97
11. INDUSTRIAL MARGIN (3+10)	-1359.62	-1466.01	-1582.43	-1709.72	-1815.94	-1911.80	-2012.74	-2119.02	-2230.92	-2348.73
12. DEPRECIATION COST-A (EQUIPMENT)	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50
13. DEPRECIATION COST-B (BUILDINGS)	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	6440.00	6440.00	6440.00	6440.00	5973.89	5475.15	4941.50	4370.49	3759.52	3105.77
15. INTEREST COST	1352.40	450.80	450.80	450.80	418.17	383.26	345.90	305.93	263.17	217.40
16. AMORTIZATION FEE				916.91	916.91	916.91	916.91	916.91	916.91	916.91
17. AMORTIZATION OF LOAN				466.11	498.74	533.65	571.01	610.98	653.74	699.51
18. ACUMULATED AMORTIZATION OF LOAN				466.11	964.85	1498.50	2069.51	2680.48	3334.23	4033.74
19. PRODUCTION COSTS (2+10+12+13-15)	-3810.15	-3210.61	-3537.46	-3890.82	-4076.96	-4189.94	-4307.63	-4430.21	-4557.86	-4690.77
20. GROSS PROFIT (1+19)	-3254.27	-2459.06	-2575.48	-2702.77	-2776.36	-2837.32	-2900.90	-2967.21	-3036.34	-3108.39
21. CORPORATE TAX										
22. NET PROFIT	-3254.27	-2459.06	-2575.48	-2702.77	-2776.36	-2837.32	-2900.90	-2967.21	-3036.34	-3108.39

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	-1359.62	-1466.01	-1582.43	-1709.72	-1815.94	-1911.80	-2012.74	-2119.02	-2230.92	-2348.73
INTEREST COST (15)	1352.40	450.80	450.80	450.80	418.17	383.26	345.90	305.93	263.17	217.40
AMORTIZATION OF LOAN (17)				466.11	498.74	533.65	571.01	610.98	653.74	699.51
A. WORKING CAPITAL	1288.19	1126.36	1276.12	1437.64	1521.26	1568.69	1618.06	1669.44	1722.91	1778.54
B. CASH FLOW (11-15-17)	-2712.02	-1916.81	-2033.23	-2626.63	-2732.85	-2828.72	-2929.66	-3035.93	-3147.83	-3265.65
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2633.03	-1806.78	-1860.69	-2333.72	-2357.38	-2369.00	-2382.08	-2396.59	-2412.55	-2429.95
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2633.03	-4439.81	-6300.50	-8634.22	-10991.60	-13360.61	-15742.69	-18139.28	-20551.83	-22981.78
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	555.88	751.55	961.98	1188.05	1300.60	1352.63	1406.73	1463.00	1521.52	1582.38
PRODUCTION COSTS (19)	-3810.15	-3210.61	-3537.46	-3890.82	-4076.96	-4189.94	-4307.63	-4430.21	-4557.86	-4690.77
GROSS PROFIT (20)	-3254.27	-2459.06	-2575.48	-2702.77	-2776.36	-2837.32	-2900.90	-2967.21	-3036.34	-3108.39
CORPORATE TAX (21)										
NET PROFIT (22)	-3254.27	-2459.06	-2575.48	-2702.77	-2776.36	-2837.32	-2900.90	-2967.21	-3036.34	-3108.39
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3254.27	-2459.06	-2575.48	-2702.77	-2776.36	-2837.32	-2900.90	-2967.21	-3036.34	-3108.39
ACUMULATED UNDISTRICTED PROFITS	-3254.27	-5713.33	-8288.81	-10991.58	-13767.94	-16605.25	-19506.15	-22473.36	-25509.70	-28618.08
TOTAL INVESTMENT	6440.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									



A L T E R N A T E - 2

E V A L U A T I O N - 3

We assume:

- All variables as in Evaluation 1.
- 5% increase in sales.

Results:

- Rates of return on  
total investment ..... <0,2%
- Pay-back period ..... >11 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IPERIA</b>										
<b>-----</b>										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
<b>*****</b>										
1. TOTAL SALES	530.92	717.80	918.79	1134.70	1242.20	1291.89	1343.57	1397.31	1453.20	1511.33
2. TOTAL RAW MATERIAL COST	-475.12	-648.55	-838.12	-1045.03	-1155.03	-1212.79	-1273.43	-1337.10	-1403.95	-1474.15
3. OPERATING MARGIN (1+2)	55.80	69.26	80.67	89.67	87.17	79.10	70.14	60.21	49.25	37.18
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-33.17	-34.16	-35.19	-36.24	-37.33	-38.45	-39.60	-40.79	-42.01	-43.27
8. MAINTENANCE-REPAIR COST	-199.00	-204.97	-211.11	-217.45	-223.97	-230.69	-237.61	-244.74	-252.08	-259.64
9. MARKETING COST	-15.93	-21.53	-27.56	-34.04	-37.27	-38.76	-40.31	-41.92	-43.60	-45.34
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1439.63	-1568.00	-1705.00	-1851.13	-1959.75	-2049.82	-2144.15	-2242.96	-2346.44	-2454.83
11. INDUSTRIAL MARGIN (3+10)	-1383.83	-1498.74	-1624.33	-1761.46	-1872.58	-1970.72	-2074.01	-2182.74	-2297.19	-2417.65
12. DEPRECIATION COST-A (EQUIPMENT)	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50
13. DEPRECIATION COST-B (BUILDINGS)	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	6440.00	6440.00	6440.00	6440.00	5973.89	5475.15	4941.50	4370.49	3759.52	3105.77
15. INTEREST COST	1352.40	450.80	450.80	450.80	418.17	383.26	345.90	305.93	263.17	217.40
16. AMORTIZATION FEE				916.91	916.91	916.91	916.91	916.91	916.91	916.91
17. AMORTIZATION OF LOAN				466.11	498.74	533.65	571.01	610.98	653.74	699.51
18. ACUMULATED AMORTIZATION OF LOAN				466.11	964.85	1498.50	2069.51	2680.48	3334.23	4033.74
19. PRODUCTION COSTS (2+10+12+13-15)	-3809.40	-3209.60	-3536.17	-3889.22	-4075.21	-4188.12	-4305.74	-4428.24	-4555.81	-4688.64
20. GROSS PROFIT (1+19)	-3278.48	-2491.79	-2617.38	-2754.51	-2833.01	-2896.23	-2962.17	-3030.93	-3102.61	-3177.31
21. CORPORATE TAX										
22. NET PROFIT	-3278.48	-2491.79	-2617.38	-2754.51	-2833.01	-2896.23	-2962.17	-3030.93	-3102.61	-3177.31

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	-1383.83	-1498.74	-1624.33	-1761.46	-1872.58	-1970.72	-2074.01	-2182.74	-2297.19	-2417.65
INTEREST COST (15)	1352.40	450.80	450.80	450.80	418.17	383.26	345.90	305.93	263.17	217.40
AMORTIZATION OF LOAN (17)				466.11	498.74	533.65	571.01	610.98	653.74	699.51
A. WORKING CAPITAL	1281.70	1117.59	1264.89	1423.77	1506.08	1552.90	1601.63	1652.36	1705.14	1760.07
B. CASH FLOW (11-15-17)	-2736.23	-1949.54	-2075.13	-2678.37	-2789.50	-2887.63	-2990.93	-3099.65	-3214.10	-3334.57
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW/DISCOUNT FACTOR (B * C)	-2656.54	-1837.43	-1899.04	-2379.70	-2406.24	-2418.34	-2431.90	-2446.90	-2463.34	-2481.23
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2656.54	-4494.17	-6393.20	-8772.90	-11179.15	-13597.49	-16029.39	-18476.28	-20939.62	-23420.85
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	530.92	717.80	918.79	1134.70	1242.20	1291.89	1343.57	1397.31	1453.20	1511.33
PRODUCTION COSTS (19)	-3809.40	-3209.60	-3536.17	-3889.22	-4075.21	-4188.12	-4305.74	-4428.24	-4555.81	-4688.64
GROSS PROFIT (20)	-3278.48	-2491.79	-2617.38	-2754.51	-2833.01	-2896.23	-2962.17	-3030.93	-3102.61	-3177.31
CORPORATE TAX (21)										
NET PROFIT (22)	-3278.48	-2491.79	-2617.38	-2754.51	-2833.01	-2896.23	-2962.17	-3030.93	-3102.61	-3177.31
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3278.48	-2491.79	-2617.38	-2754.51	-2833.01	-2896.23	-2962.17	-3030.93	-3102.61	-3177.31
ACUMULATED UNDISTRICTED PROFITS	-3278.48	-5770.28	-8387.65	-11142.17	-13975.17	-16871.40	-19833.57	-22864.50	-25967.10	-29144.41
TOTAL INVESTMENT	6440.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE - 2

EVALUATION - 4

We assume:

- All variables as in Evaluation 1.
- 5% increase in sales.

Results:

- Rates of return on  
total investment ..... <0,2%
- Pay-back period ..... >11 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>-----</b>										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
<b>*****</b>										
1. TOTAL SALES	479.96	648.91	830.60	1025.79	1122.97	1167.89	1214.61	1263.19	1313.72	1366.27
2. TOTAL RAW MATERIAL COST	-475.12	-648.55	-838.12	-1045.03	-1155.03	-1212.79	-1273.43	-1337.10	-1403.95	-1474.15
3. OPERATING MARGIN (1+2)	4.84	0.36	-7.52	-19.24	-32.06	-44.90	-58.82	-73.91	-90.24	-107.88
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-140.96	-149.01	-177.44	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-33.17	-34.16	-35.19	-36.24	-37.33	-38.45	-39.60	-40.79	-42.01	-43.27
8. MAINTENANCE-REPAIR COST	-199.00	-204.97	-211.11	-217.45	-223.97	-230.69	-237.61	-244.74	-252.08	-259.64
9. MARKETING COST	-14.40	-19.47	-24.92	-30.77	-33.69	-35.04	-36.44	-37.90	-39.41	-40.99
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1438.10	-1565.94	-1702.35	-1847.87	-1956.17	-2046.10	-2140.29	-2238.93	-2342.26	-2450.48
11. INDUSTRIAL MARGIN (3+10)	-1433.26	-1565.58	-1709.87	-1867.11	-1988.24	-2091.00	-2199.11	-2312.84	-2432.49	-2558.37
12. DEPRECIATION COST-A (EQUIPMENT)	-440.50	-440.50	440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50
13. DEPRECIATION COST-B (BUILDINGS)	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	6440.00	6440.00	6440.00	6440.00	5973.89	5475.15	4941.50	4370.49	3759.52	3105.77
15. INTEREST COST	1352.40	450.80	450.80	450.80	418.17	383.26	345.90	305.93	263.17	217.40
16. AMORTIZATION FEE				916.91	916.91	916.91	916.91	916.91	916.91	916.91
17. AMORTIZATION OF LOAN				466.11	498.74	533.65	571.01	610.98	653.74	699.51
18. ACCUMULATED AMORTIZATION OF LOAN				466.11	964.85	1498.50	2069.51	2680.48	3334.23	4033.74
19. PRODUCTION COSTS (2+10+12+13-15)	-3807.87	-3207.53	-3533.52	-3885.95	-4071.63	-4184.40	-4301.87	-4424.21	-4551.62	-4684.29
20. GROSS PROFIT (1+19)	-3327.91	-2558.63	-2702.92	-2860.16	-2948.66	-3016.51	-3087.26	-3161.02	-3237.91	-3318.02
21. CORPORATE TAX										
22. NET PROFIT	-3327.91	-2558.63	-2702.92	-2860.16	-2948.66	-3016.51	-3087.26	-3161.02	-3237.91	-3318.02

	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
CASH FLOW TABLES										
*****										
INDUSTRIAL MARGIN (11)	-1433.26	-1565.58	-1709.87	-1867.11	-1988.24	-2091.00	-2199.11	-2312.84	-2432.49	-2558.37
INTEREST COST (15)	1352.40	450.80	450.80	450.80	418.17	383.26	345.90	305.93	263.17	217.40
AMORTIZATION OF LOAN (17)				466.11	498.74	533.65	571.01	610.98	653.74	699.51
A. WORKING CAPITAL	1268.45	1099.68	1241.96	1395.45	1475.08	1520.66	1568.10	1617.49	1668.88	1722.35
B. CASH FLOW (11-15-17)	-2785.66	-2016.38	-2160.67	-2784.02	-2905.15	-3007.91	-3116.02	-3229.75	-3349.40	-3475.28
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2704.53	-1900.63	-1977.32	-2473.57	-2506.01	-2519.08	-2533.61	-2549.60	-2567.04	-2585.93
E. ACCUMULATED CASH FLOW AT DEVALUATION RATE	-2704.53	-4605.15	-6582.47	-9056.04	-11562.05	-14081.13	-16614.73	-19164.33	-21731.37	-24317.30
F. PAY OUT TIME	11.00									
NET INCOME STATEMENT										
TOTAL SALES (1)	479.96	648.91	830.60	1025.79	1122.97	1167.89	1214.61	1263.19	1313.72	1366.27
PRODUCTION COSTS (19)	-3807.87	-3207.53	-3533.52	-3885.95	-4071.63	-4184.40	-4301.87	-4424.21	-4551.62	-4684.29
GROSS PROFIT (20)	-3327.91	-2558.63	-2702.92	-2860.16	-2948.66	-3016.51	-3087.26	-3161.02	-3237.91	-3318.02
CORPORATE TAX (21)										
NET PROFIT (22)	-3327.91	-2558.63	-2702.92	-2860.16	-2948.66	-3016.51	-3087.26	-3161.02	-3237.91	-3318.02
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3327.91	-2558.63	-2702.92	-2860.16	-2948.66	-3016.51	-3087.26	-3161.02	-3237.91	-3318.02
ACCUMULATED UNDISTRICTED PROFITS	-3327.91	-5886.54	-8589.46	-11449.62	-14398.28	-17414.79	-20502.05	-23663.07	-26900.98	-30219.00
TOTAL INVESTMENT	6440.00									
RATIOS										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

A L T E R N A T E - 2

E V A L U A T I O N - 5

We assume:

- All variables as in Evaluation 1.
- 10% increase in sales.

Results:

- Rates of return on  
total investment ..... < 0,2%
- Pay-back period ..... > 11 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>-----</b>										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
<b>*****</b>										
1. TOTAL SALES	455.00	615.16	787.40	972.44	1064.57	1107.15	1151.44	1197.50	1245.40	1295.21
2. TOTAL RAW MATERIAL COST	-475.12	-648.55	-838.12	-1045.03	-1155.03	-1212.79	-1273.43	-1337.10	-1403.95	-1474.15
3. OPERATING MARGIN (1+2)	-20.12	-33.39	-50.72	-72.59	-90.46	-105.63	-121.99	-139.60	-158.55	-178.94
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-204.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-33.17	-34.16	-35.19	-36.24	-37.33	-38.45	-39.60	-40.79	-42.01	-43.27
8. MAINTENANCE-REPAIR COST	-199.00	-204.97	-211.11	-217.45	-223.97	-230.69	-237.61	-244.74	-252.08	-259.64
9. MARKETING COST	-13.65	-18.45	-23.62	-29.17	-31.94	-33.21	-34.54	-35.92	-37.36	-38.86
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1437.35	-1564.92	-1701.05	-1846.27	-1954.42	-2044.28	-2138.39	-2236.96	-2340.21	-2448.35
11. INDUSTRIAL MARGIN (3+10)	-1457.47	-1598.31	-1751.77	-1918.85	-2044.89	-2149.91	-2260.38	-2376.56	-2498.76	-2627.29
12. DEPRECIATION COST-A (EQUIPMENT)	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50
13. DEPRECIATION COST-B (BUILDINGS)	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75
BANK LOANS										
14. OUTSTANDING BALANCE OF LOAN	6440.00	6440.00	6440.00	6440.00	5973.89	5475.15	4941.50	4370.49	3759.52	3105.77
15. INTEREST COST	1352.40	450.80	450.80	450.80	418.17	383.26	345.90	305.93	263.17	217.40
16. AMORTIZATION FEE				916.91	916.91	916.91	916.91	916.91	916.91	916.91
17. AMORTIZATION OF LOAN				466.11	498.74	533.65	571.01	610.98	653.74	699.51
18. ACCUMULATED AMORTIZATION OF LOAN				466.11	964.85	1498.50	2069.51	2680.48	3334.23	4033.74
19. PRODUCTION COSTS (2+10+12+13-15)	-3807.12	-3206.52	-3532.22	-3884.35	-4069.88	-4182.58	-4299.97	-4422.24	-4549.57	-4682.15
20. GROSS PROFIT (1+19)	-3352.12	-2591.36	-2744.82	-2911.90	-3005.31	-3075.42	-3148.53	-3224.74	-3304.18	-3386.94
21. CORPORATE TAX										
22. NET PROFIT	-3352.12	-2591.36	-2744.82	-2911.90	-3005.31	-3075.42	-3148.53	-3224.74	-3304.18	-3386.94



	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
*****										
INDUSTRIAL MARGIN (11)	-1457.47	-1598.31	-1751.77	-1918.85	-2044.89	-2149.91	-2260.38	-2376.56	-2498.76	-2627.29
INTEREST COST (15)	1352.40	450.80	450.80	450.80	418.17	383.26	345.90	305.93	263.17	217.40
AMORTIZATION OF LOAN (17)				466.11	498.74	533.65	571.01	610.98	653.74	699.51
A. WORKING CAPITAL	1261.96	1090.90	1230.73	1381.58	1459.89	1504.87	1551.68	1600.41	1651.11	1703.88
B. CASH FLOW (11-15-17)	-2809.87	-2049.11	-2202.57	-2835.76	-2961.80	-3066.82	-3177.29	-3293.47	-3415.67	-3544.20
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2728.03	-1931.48	-2015.66	-2519.54	-2554.87	-2568.42	-2583.43	-2599.90	-2617.83	-2637.22
E. ACCUMULATED CASH FLOW AT DEVALUATION RATE	-2728.03	-4659.52	-6675.18	-9194.72	-11749.59	-14318.01	-16901.43	-19501.33	-22119.16	-24756.37
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	455.00	615.16	787.40	972.44	1064.57	1107.15	1151.44	1197.50	1245.40	1295.21
PRODUCTION COSTS (19)	-3807.12	-3206.52	-3532.22	-3884.35	-4069.88	-4182.58	-4299.97	-4422.24	-4549.57	-4682.15
GROSS PROFIT (20)	-3352.12	-2591.36	-2744.82	-2911.90	-3005.31	-3075.42	-3148.53	-3224.74	-3304.18	-3386.94
CORPORATE TAX (21)										
NET PROFIT (22)	-3352.12	-2591.36	-2744.82	-2911.90	-3005.31	-3075.42	-3148.53	-3224.74	-3304.18	-3386.94
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3352.12	-2591.36	-2744.82	-2911.90	-3005.31	-3075.42	-3148.53	-3224.74	-3304.18	-3386.94
ACUMULATED UNDISTRICTED PROFITS	-3352.12	-5943.48	-8688.30	-11600.21	-14605.52	-17680.94	-20829.47	-24054.21	-27358.39	-30745.33
TOTAL INVESTMENT	6440.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE - 2

EVALUATION - 6

We assume:

- All variables as in Evaluation 1.
- 10% increase in investment.

Results:

- Rates of return on  
total investment ..... <0,2%
- Pay-back period ..... >11 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	505.44	683.35	874.69	1080.25	1182.59	1229.89	1279.09	1330.25	1383.46	1438.80
2. TOTAL RAW MATERIAL COST	-475.12	-648.55	-838.12	-1045.03	-1155.03	-1212.79	-1273.43	-1337.10	-1403.95	-1474.15
3. OPERATING MARGIN (1+2)	30.32	34.81	36.57	35.22	27.55	17.10	5.66	-6.85	-20.49	-35.35
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-36.48	-37.58	-38.70	-39.87	-41.06	-42.29	-43.56	-44.87	-46.22	-47.60
8. MAINTENANCE-REPAIR COST	-218.90	-225.46	-232.23	-239.19	-246.37	-253.76	-261.37	-269.21	-277.29	-285.61
9. MARKETING COST	-15.16	-20.50	-26.24	-32.41	-35.48	-36.90	-38.37	-39.91	-41.50	-43.16
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1462.08	-1590.88	-1728.30	-1874.87	-1984.09	-2074.88	-2169.94	-2269.50	-2373.76	-2482.95
11. INDUSTRIAL MARGIN (3+10)	-1431.76	-1556.07	-1691.73	-1839.65	-1956.54	-2057.77	-2164.28	-2276.34	-2394.25	-2518.30
12. DEPRECIATION COST-A (EQUIPMENT)	-484.50	-484.50	-484.50	-484.50	-484.50	-484.50	-484.50	-484.50	-484.50	-484.50
13. DEPRECIATION COST-B (BUILDINGS)	-111.95	-111.95	-111.95	-111.95	-111.95	-111.95	-111.95	-111.95	-111.95	-111.95
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	7084.00	7084.00	7084.00	7084.00	6571.28	6022.66	5435.65	4807.54	4135.47	3416.35
15. INTEREST COST	1487.64	495.88	495.88	495.88	459.99	421.59	380.50	336.53	289.48	239.14
16. AMORTIZATION FEE				1008.60	1008.60	1008.60	1008.60	1008.60	1008.60	1008.60
17. AMORTIZATION OF LOAN				512.72	548.61	587.02	628.11	672.07	719.12	769.46
18. ACUMULATED AMORTIZATION OF LOAN				512.72	1061.34	1648.35	2276.46	2948.53	3667.65	4437.11
19. PRODUCTION COSTS (2+10+12+13-15)	-4021.29	-3331.76	-3658.75	-4012.23	-4195.57	-4305.70	-4420.31	-4539.57	-4663.64	-4792.69
20. GROSS PROFIT (1+19)	-3515.85	-2648.40	-2784.06	-2931.98	-3012.98	-3075.81	-3141.23	-3209.32	-3280.18	-3353.90
21. CORPORATE TAX										
22. NET PROFIT	-3515.85	-2648.40	-2784.06	-2931.98	-3012.98	-3075.81	-3141.23	-3209.32	-3280.18	-3353.90

	1	2	3	4	5	6	7	8	9	10
<u>FOSTER WHEELER IBERIA</u>										
<u>CASH FLOW TABLES</u>										
*****										
INDUSTRIAL MARGIN (11)	-1431.76	-1556.07	-1691.73	-1839.65	-1956.54	-2057.77	-2164.28	-2276.34	-2394.25	-2518.30
INTEREST COST (12)	1487.64	495.88	495.88	495.88	459.99	421.59	380.50	336.53	289.48	239.14
AMORTIZATION OF LOAN (17)				512.72	548.61	587.02	628.11	672.07	719.12	769.46
A. WORKING CAPITAL	1336.92	1140.66	1285.69	1442.13	1522.26	1567.56	1614.67	1663.67	1714.62	1767.59
B. CASH FLOW (11-15-17)	-2919.40	-2051.95	-2187.61	-2848.26	-2965.14	-3066.37	-3172.88	-3284.95	-3402.85	-3526.90
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2834.37	-1934.16	-2001.97	-2530.64	-2557.76	-2568.04	-2579.85	-2593.17	-2608.00	-2624.35
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2834.37	-4768.53	-6770.51	-9301.15	-11858.90	-14426.95	-17006.79	-19599.96	-22207.96	-24832.31
F. PAY OUT TIME	11.00									
<u>NET INCOME STATEMENT</u>										
TOTAL SALES (1)	505.44	683.35	874.69	1080.25	1182.59	1229.89	1279.09	1330.25	1383.46	1438.80
PRODUCTION COSTS (19)	-4021.29	-3331.76	-3658.75	-4012.23	-4195.57	-4305.70	-4420.31	-4539.57	-4663.64	-4792.69
GROSS PROFIT (20)	-3515.85	-2648.40	-2784.06	-2931.98	-3012.98	-3075.81	-3141.23	-3209.32	-3280.18	-3353.90
CORPORATE TAX (21)										
NET PROFIT (22)	-3515.85	-2648.40	-2784.06	-2931.98	-3012.98	-3075.81	-3141.23	-3209.32	-3280.18	-3353.90
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3515.85	-2648.40	-2784.06	-2931.98	-3012.98	-3075.81	-3141.23	-3209.32	-3280.18	-3353.90
ACUMULATED UNDISTRIBUTED PROFITS	-3515.85	-6164.26	-8948.32	-11880.30	-14893.28	-17969.09	-21110.32	-24319.64	-27599.82	-30953.72
TOTAL INVESTMENT	7084.00									
<u>RATIOS</u>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE - 2

EVALUATION - 7

We assume:

- All variables as in Evaluation 1.
- 10% decrease in investment.

Results:

- Rates of return on  
total investment ..... <0,2%
- Pay-back period ..... >11 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	505.44	683.35	874.69	1080.25	1182.59	1229.89	1279.09	1330.25	1383.44	1438.80
2. TOTAL RAW MATERIAL COST	-475.12	-648.55	-838.12	-1045.03	-1155.03	-1212.79	-1273.43	-1337.10	-1403.95	-1474.15
3. OPERATING MARGIN (1+2)	30.32	34.81	36.57	35.22	27.55	17.10	5.66	-6.85	-20.49	-35.35
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-29.85	-30.74	-31.67	-32.52	-33.60	-34.60	-35.64	-36.71	-37.81	-38.95
8. MAINTENANCE-REPAIR COST	-179.10	-184.47	-190.00	-195.70	-201.57	-207.62	-213.85	-220.27	-226.87	-233.68
9. MARKETING COST	-15.16	-20.50	-26.24	-32.41	-35.48	-36.90	-38.37	-39.91	-41.50	-43.16
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1415.65	-1543.06	-1679.04	-1824.13	-1931.83	-2021.05	-2114.50	-2212.39	-2314.94	-2422.37
11. INDUSTRIAL MARGIN (3+10)	-1385.33	-1508.25	-1642.47	-1788.92	-1904.28	-2003.94	-2108.84	-2219.24	-2335.43	-2457.72
12. DEPRECIATION COST-A (EQUIPMENT)	-396.40	-396.40	-396.40	-396.40	-396.40	-396.40	-396.40	-396.40	-396.40	-396.40
13. DEPRECIATION COST-B (BUILDINGS)	-91.60	-91.60	-91.60	-91.60	-91.60	-91.60	-91.60	-91.60	-91.60	-91.60
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	5796.00	5796.00	5796.00	5796.00	5376.50	4927.63	4447.35	3933.44	3383.56	2795.19
15. INTEREST COST	1217.16	405.72	405.72	405.72	376.35	344.93	311.31	275.34	236.85	195.66
16. AMORTIZATION FEE				825.22	825.22	825.22	825.22	825.22	825.22	825.22
17. AMORTIZATION OF LOAN				419.50	448.87	480.29	513.91	549.88	588.37	629.56
18. ACUMULATED AMORTIZATION OF LOAN				419.50	868.37	1348.65	1862.56	2412.44	3000.81	3630.36
19. PRODUCTION COSTS (2+10+12+13-15)	-3595.93	-3085.32	-3410.88	-3762.88	-3951.22	-4066.77	-4187.24	-4312.83	-4443.74	-4580.18
20. GROSS PROFIT (1+19)	-3090.49	-2401.97	-2536.19	-2682.64	-2768.64	-2836.88	-2908.15	-2982.58	-3060.28	-3141.38
21. CORPORATE TAX										
22. NET PROFIT	-3090.49	-2401.97	-2536.19	-2682.64	-2768.64	-2836.88	-2908.15	-2982.58	-3060.28	-3141.38

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>CASH FLOW TABLE</b>										
*****										
INDUSTRIAL MARGIN (11)	-1385.33	-1508.25	-1642.47	-1788.92	-1904.28	-2003.94	-2108.84	-2219.24	-2335.43	-2457.72
INTEREST COST (15)	1217.16	405.72	405.72	405.72	376.35	344.93	311.31	275.34	236.85	195.66
AMORTIZATION OF LOAN (17)				419.50	448.87	480.29	513.91	549.88	588.37	629.56
A. WORKING CAPITAL	1213.21	1076.59	1221.14	1377.09	1458.89	1505.99	1555.06	1606.17	1659.39	1714.82
B. CASH FLOW (11-15-17)	-2602.49	-1913.97	-2048.19	-2614.14	-2729.50	-2829.16	-2934.06	-3044.46	-3160.65	-3282.94
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2526.69	-1804.10	-1874.38	-2322.63	-2354.49	-2369.38	-2385.66	-2403.32	-2422.38	-2442.81
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2526.69	-4330.79	-6205.17	-8527.80	-10882.29	-13251.67	-15637.33	-18040.65	-20463.03	-22905.84
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
-----										
TOTAL SALES (1)	505.44	683.35	874.69	1080.25	1182.59	1229.89	1279.09	1330.25	1383.46	1438.80
PRODUCTION COSTS (19)	-3595.93	-3085.32	-3410.88	-3762.88	-3951.22	-4066.77	-4187.24	-4312.83	-4443.74	-4580.18
GROSS PROFIT (20)	-3090.49	-2401.97	-2536.19	-2682.64	-2768.64	-2836.88	-2908.15	-2982.58	-3060.28	-3141.38
CORPORATE TAX (21)										
NET PROFIT (22)	-3090.49	-2401.97	-2536.19	-2682.64	-2768.64	-2836.88	-2908.15	-2982.58	-3060.28	-3141.38
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3090.49	-2401.97	-2536.19	-2682.64	-2768.64	-2836.88	-2908.15	-2982.58	-3060.28	-3141.38
ACUMULATED UNDISTRICTED PROFITS	-3090.49	-5492.46	-8028.65	-10711.28	-13479.92	-16316.80	-19224.95	-22207.53	-25267.81	-28409.20
TOTAL INVESTMENT	5796.00									
<b>RATIOS</b>										
-----										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE - 2

EVALUATION - 8

We assume:

- All variables as in Evaluation 1.
- 10% increase in salaries.

Results:

- Rates of return on  
total investment .....  $< 0,2\%$
- Pay-back period .....  $> 11$  years



	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>PRODUCTION COSTS AND NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	505.44	683.35	874.69	1080.25	1182.59	1229.89	1279.09	1330.25	1383.46	1438.80
2. TOTAL RAW MATERIAL COST	-475.12	-648.55	-838.12	-1045.03	-1155.03	-1212.79	-1273.43	-1337.10	-1403.95	-1474.15
3. OPERATING MARGIN (1+2)	30.32	34.81	36.57	35.22	27.55	17.10	5.66	-6.85	-20.49	-35.35
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-169.05	-177.50	-186.38	-195.70	-205.48	-215.76	-226.54	-237.87	-249.76	-262.25
CATEGORY-B	-544.95	-572.20	-600.81	-630.85	-662.39	-695.51	-730.29	-766.80	-805.14	-845.40
CATEGORY-C	-227.85	-239.24	-251.20	-263.76	-276.95	-290.80	-305.34	-320.61	-336.64	-353.47
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-1046.85	-1099.19	-1154.15	-1211.86	-1272.45	-1336.08	-1402.88	-1473.02	-1546.67	-1624.01
6. OVERHEAD COST	-52.34	-54.96	-57.71	-60.59	-63.62	-66.80	-70.14	-73.65	-77.33	-81.20
7. INSURANCE COST	-33.17	-34.16	-35.19	-36.24	-37.33	-38.45	-39.60	-40.79	-42.01	-43.27
8. MAINTENANCE-REPAIR COST	-199.00	-204.97	-211.11	-217.45	-223.97	-230.69	-237.61	-244.74	-252.08	-259.64
9. MARKETING COST	-15.16	-20.50	-26.24	-32.41	-35.48	-36.90	-38.37	-39.91	-41.50	-43.16
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1529.27	-1661.89	-1803.34	-1954.16	-2067.85	-2163.34	-2263.37	-2368.15	-2477.92	-2592.91
11. INDUSTRIAL MARGIN (3+10)	-1498.95	-1627.09	-1766.77	-1918.94	-2040.30	-2146.24	-2257.71	-2375.00	-2498.41	-2628.26
12. DEPRECIATION COST-A (EQUIPMENT)	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50
13. DEPRECIATION COST-B (BUILDINGS)	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	6440.00	6440.00	6440.00	6440.00	5973.89	5475.15	4941.50	4370.49	3759.52	3105.77
15. INTEREST COST	1352.40	450.80	450.80	450.80	418.17	383.26	345.90	305.93	263.17	217.40
16. AMORTIZATION FEE				916.91	916.91	916.91	916.91	916.91	916.91	916.91
17. AMORTIZATION OF LOAN				466.11	498.74	533.65	571.01	610.98	653.74	699.51
18. ACUMULATED AMORTIZATION OF LOAN				466.11	964.85	1498.50	2069.51	2680.48	3334.23	4033.74
19. PRODUCTION COSTS (2+10+12+13+15)	-3899.04	-3303.49	-3634.51	-3992.24	-4183.31	-4301.64	-4424.95	-4553.43	-4687.29	-4826.71
20. GROSS PROFIT (1+19)	-3393.60	-2620.14	-2759.82	-2911.99	-3000.72	-3071.75	-3145.87	-3223.19	-3303.83	-3387.91
21. CORPORATE TAX										
22. NET PROFIT	-3393.60	-2620.14	-2759.82	-2911.99	-3000.72	-3071.75	-3145.87	-3223.19	-3303.83	-3387.91

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
INDUSTRIAL MARGIN (11)	-1498.95	-1627.09	-1766.77	-1918.94	-2040.30	-2146.24	-2257.71	-2375.00	-2498.41	-2628.26
INTEREST COST (15)	1352.40	450.80	450.80	450.80	418.17	383.26	345.90	305.93	263.17	217.40
AMORTIZATION OF LOAN (17)				466.11	498.74	533.65	571.01	610.98	653.74	699.51
A. WORKING CAPITAL	1305.21	1140.27	1286.65	1444.50	1527.21	1575.24	1625.25	1677.33	1731.53	1787.96
B. CASH FLOW (11-15-17)	-2851.35	-2077.89	-2217.57	-2835.85	-2957.21	-3063.15	-3174.62	-3291.91	-3415.32	-3545.17
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2768.30	-1958.61	-2029.39	-2519.62	-2550.92	-2565.34	-2581.26	-2598.67	-2617.56	-2637.94
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2768.30	-4726.91	-6756.30	-9275.92	-11826.83	-14392.18	-16973.43	-19572.10	-22189.66	-24827.60
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	505.44	683.35	974.69	1080.25	1182.59	1229.89	1279.09	1330.25	1383.46	1438.80
PRODUCTION COSTS (19)	-3899.04	-3303.49	-3634.51	-3992.24	-4183.31	-4301.64	-4424.95	-4553.43	-4687.29	-4826.71
GROSS PROFIT (20)	-3393.60	-2620.14	-2759.82	-2911.99	-3000.72	-3071.75	-3145.87	-3223.19	-3303.83	-3387.91
CORPORATE TAX (21)										
NET PROFIT (22)	-3393.60	-2620.14	-2759.82	-2911.99	-3000.72	-3071.75	-3145.87	-3223.19	-3303.83	-3387.91
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3393.60	-2620.14	-2759.82	-2911.99	-3000.72	-3071.75	-3145.87	-3223.19	-3303.83	-3387.91
ACUMULATED UNDISTRIDUTED PROFITS	-3393.60	-6013.74	-9773.56	-11685.55	-14686.27	-17758.02	-20903.89	-24127.07	-27430.90	-30818.81
TOTAL INVESTMENT	6440.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

ALTERNATE - 2

EVALUATION - 9

We assume:

- All variables as in Evaluation 1.
- 10% decrease in salaries.

Results:

- Rates of return on  
total investment .....  $< 0,2\%$
- Pay-back period .....  $> 11$  years

	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBER: A										
-----										
PRODUCTION COSTS AND										
NET INCOME STATEMENT										
IN THOUSAND DOLLARS										
*****										
1. TOTAL SALES	505.44	683.35	874.69	1080.25	1182.59	1229.89	1279.09	1330.25	1383.46	1438.80
2. TOTAL RAW MATERIAL COST	-475.12	-648.55	-838.12	-1045.03	-1155.03	-1212.79	-1273.43	-1337.10	-1403.95	-1474.15
3. OPERATING MARGIN (1+2)	30.32	34.81	36.57	35.22	27.55	17.10	5.66	-6.85	-20.49	-35.35
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-494.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-137.55	-144.43	-151.65	-159.23	-167.19	-175.55	-184.33	-193.55	-203.22	-213.39
CATEGORY-B	-446.25	-468.56	-491.99	-516.59	-542.42	-569.54	-598.02	-627.92	-659.31	-692.28
CATEGORY-C	-185.85	-195.14	-204.90	-215.14	-225.90	-237.20	-249.06	-261.51	-274.59	-288.31
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-874.65	-918.38	-964.30	-1012.52	-1063.14	-1116.30	-1172.11	-1230.72	-1292.26	-1356.87
6. OVERHEAD COST	-43.73	-45.92	-48.22	-50.63	-53.16	-55.81	-58.61	-61.54	-64.61	-67.84
7. INSURANCE COST	-33.17	-34.16	-35.19	-36.24	-37.33	-38.45	-39.60	-40.79	-42.01	-43.27
8. MAINTENANCE-REPAIR COST	-199.00	-204.97	-211.11	-217.45	-223.97	-230.69	-237.61	-244.74	-252.08	-259.64
9. MARKETING COST	-15.16	-20.50	-26.24	-32.41	-35.48	-36.90	-38.37	-39.91	-41.50	-43.16
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1348.46	-1472.04	-1604.00	-1744.85	-1848.08	-1932.58	-2021.07	-2113.73	-2210.78	-2312.41
11. INDUSTRIAL MARGIN (3+10)	-1318.14	-1437.23	-1567.43	-1709.63	-1820.52	-1915.48	-2015.41	-2120.58	-2231.27	-2347.76
12. DEPRECIATION COST-A (EQUIPMENT)	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50
13. DEPRECIATION COST-B (BUILDINGS)	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75
BANK LOANS										
14. OUTSTANDING BALANCE OF LOAN	6440.00	6440.00	6440.00	6440.00	5973.89	5475.15	4941.50	4370.49	3759.52	3105.77
15. INTEREST COST	1352.40	450.80	450.80	450.80	418.17	383.26	345.90	305.93	263.17	217.40
16. AMORTIZATION FEE				916.91	916.91	916.91	916.91	916.91	916.91	916.91
17. AMORTIZATION OF LOAN				466.11	498.74	533.65	571.01	610.98	653.74	699.51
18. ACUMULATED AMORTIZATION OF LOAN				466.11	964.85	1498.50	2069.51	2680.48	3334.23	4033.74
19. PRODUCTION COSTS (2+10+12+13+15)	-3718.23	-3113.64	-3435.17	-3782.93	-3963.53	-4070.88	-4182.65	-4299.02	-4420.15	-4546.21
20. GROSS PROFIT (1+19)	-3212.79	-2430.28	-2560.48	-2702.68	-2780.95	-2840.99	-2903.56	-2968.77	-3036.69	-3107.42
21. CORPORATE TAX										
22. NET PROFIT	-3212.79	-2430.28	-2560.48	-2702.68	-2780.95	-2840.99	-2903.56	-2968.77	-3036.69	-3107.42

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER (PERIA)</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	-1318.14	-1437.23	-1567.43	-1709.63	-1820.52	-1915.48	-2015.41	-2120.58	-2231.27	-2347.76
INTEREST COST (15)	1352.40	450.80	450.80	450.80	418.17	383.26	345.90	305.93	263.17	217.40
AMORTIZATION OF LOAN (17)				466.11	498.74	533.65	571.01	610.98	653.74	699.51
A. WORKING CAPITAL	1244.94	1076.99	1220.20	1374.73	1453.95	1498.32	1544.49	1592.52	1642.49	1694.46
B. CASH FLOW (11-15-17)	-2670.54	-1888.03	-2018.23	-2626.54	-2737.43	-2832.39	-2932.32	-3037.49	-3148.18	-3264.67
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2592.76	-1779.65	-1846.96	-2333.65	-2361.34	-2372.08	-2384.24	-2397.83	-2412.82	-2429.22
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2592.76	-4372.41	-6219.38	-8553.03	-10914.36	-13286.44	-15670.69	-18068.51	-20481.33	-22910.55
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	505.44	683.35	874.69	1080.25	1182.59	1229.89	1279.09	1330.25	1383.46	1438.80
PRODUCTION COSTS (19)	-3718.23	-3113.64	-3435.17	-3782.93	-3963.53	-4070.88	-4182.65	-4299.02	-4420.15	-4546.21
GROSS PROFIT (20)	-3212.79	-2430.28	-2560.48	-2702.68	-2780.95	-2840.99	-2903.56	-2968.77	-3036.69	-3107.42
CORPORATE TAX (21)										
NET PROFIT (22)	-3212.79	-2430.28	-2560.48	-2702.68	-2780.95	-2840.99	-2903.56	-2968.77	-3036.69	-3107.42
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3212.79	-2430.28	-2560.48	-2702.68	-2780.95	-2840.99	-2903.56	-2968.77	-3036.69	-3107.42
ACUMULATED UNDISTRIBUTED PROFITS	-3212.79	-5643.08	-8203.55	-10906.23	-13687.18	-16528.17	-19431.73	-22400.50	-25437.19	-28544.60
TOTAL INVESTMENT	6440.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

A L T E R N A T E - 2

E V A L U A T I O N - 10

We assume:

- All variables as in Evaluation 1.
- Loan interest 4%.

Results:

- Rates of return on  
total investment ..... < 0,2%
- Pay-back period ..... > 11 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	505.44	683.35	874.69	1080.25	1182.59	1229.89	1279.09	1330.25	1383.46	1438.80
2. TOTAL RAW MATERIAL COST	-475.12	-648.55	-838.12	-1045.03	-1155.03	-1212.79	-1273.43	-1337.10	-1403.95	-1474.15
3. OPERATING MARGIN (1+2)	30.32	34.81	36.57	35.22	27.55	17.10	5.66	-6.85	-20.49	-35.35
4. UTILITIES COST	-182.75	-248.11	-318.94	-395.61	-435.00	-454.43	-474.76	-496.04	-518.31	-541.62
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.74	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-33.17	-34.14	-35.19	-36.24	-37.33	-38.45	-39.60	-40.79	-42.01	-43.27
8. MAINTENANCE-REPAIR COST	-199.00	-204.97	-211.11	-217.45	-223.97	-230.69	-237.61	-244.74	-252.08	-259.64
9. MARKETING COST	-15.16	-20.50	-26.24	-32.41	-35.48	-36.90	-38.37	-39.91	-41.50	-43.16
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1438.86	-1566.97	-1703.67	-1849.50	-1957.96	-2047.96	-2142.22	-2240.94	-2344.35	-2452.66
11. INDUSTRIAL MARGIN (3+10)	-1408.55	-1532.16	-1667.10	-1814.28	-1930.41	-2030.86	-2136.56	-2247.79	-2364.84	-2488.01
12. DEPRECIATION COST-A (EQUIPMENT)	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50
13. DEPRECIATION COST-B (BUILDINGS)	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	6440.00	6440.00	6440.00	6440.00	5903.61	5345.76	4765.59	4162.22	3534.72	2882.11
15. INTEREST COST	772.80	257.60	257.60	257.60	236.14	213.83	190.62	166.49	141.39	115.28
16. AMORTIZATION FEE				793.99	793.99	793.99	793.99	793.99	793.99	793.99
17. AMORTIZATION OF LOAN				536.39	557.85	580.16	603.37	627.50	652.60	678.71
18. ACUMULATED AMORTIZATION OF LOAN				536.39	1094.24	1674.41	2277.78	2905.28	3557.89	4236.60
19. PRODUCTION COSTS (2+10+12+13-15)	-3229.04	-3015.36	-3341.64	-3694.38	-3891.39	-4016.83	-4148.52	-4286.78	-4431.94	-4584.34
20. GROSS PROFIT (1+19)	-2723.60	-2332.01	-2466.95	-2614.13	-2708.81	-2786.94	-2869.43	-2956.53	-3048.48	-3145.55
21. CORPORATE TAX										
22. NET PROFIT	-2723.60	-2332.01	-2466.95	-2614.13	-2708.81	-2786.94	-2869.43	-2956.53	-3048.48	-3145.55

	1	2	3
<b>FOSTER WHEELER IBERIA</b>			
<b>CASH FLOW TABLES</b>			
*****			
INDUSTRIAL MARGIN (11)	-1408.55	-1532.16	-1667.10
INTEREST COST (15)	772.80	257.60	257.60
AMORTIZATION OF LOAN (17)			
A. WORKING CAPITAL	1081.87	1044.23	1189.02
B. CASH FLOW (11-15-17)	-2181.35	-1789.76	-1924.70
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-2117.81	-1687.02	-1761.37
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2117.81	-3804.83	-5566.21
F. PAY OUT TIME	11.00		
<b>NET INCOME STATEMENT</b>			
TOTAL SALES (1)	505.44	683.35	874.69
PRODUCTION COSTS (19)	-3229.04	-3015.36	-3341.64
GROSS PROFIT (20)	-2723.60	-2332.01	-2466.95
CORPORATE TAX (21)			
NET PROFIT (22)	-2723.60	-2332.01	-2466.95
DIVIDENDS ON EQUITY			
UNDISTRIBUTED PROFITS	-2723.60	-2332.01	-2466.95
ACUMULATED UNDISTRIBUTED PROFITS	-2723.60	-5055.61	-7522.56
TOTAL INVESTMENT	6440.00		
<b>RATIOS</b>			
RATE OF RETURN ON TOTAL INVESTMENT	0.20		



4	5	6	7	8	9	10
-1814.28	-1930.41	-2030.86	-2136.56	-2247.79	-2364.84	-2488.01
257.60	236.14	213.83	190.62	166.49	141.39	115.28
536.39	557.85	580.16	603.37	627.50	652.60	678.71
1345.21	1429.90	1480.30	1533.11	1588.44	1646.42	1707.17
-2608.28	-2724.41	-2824.85	-2930.55	-3041.79	-3158.83	-3282.00
0.89	0.86	0.84	0.81	0.79	0.77	0.74
-2317.42	-2350.10	-2365.77	-2382.81	-2401.21	-2420.98	-2442.12
-7883.63	-10233.72	-12599.49	-14982.30	-17383.52	-19804.50	-22246.62
1080.25	1182.59	1229.89	1279.09	1330.25	1383.46	1438.80
-3694.38	-3891.39	-4016.83	-4148.52	-4286.78	-4431.94	-4584.34
-2614.13	-2708.81	-2786.94	-2869.43	-2956.53	-3048.48	-3145.55
-2614.13	-2708.81	-2786.94	-2869.43	-2956.53	-3048.48	-3145.55
-2614.13	-2708.81	-2786.94	-2869.43	-2956.53	-3048.48	-3145.55
-10136.69	-12845.50	-15632.44	-18501.87	-21458.40	-24506.88	-27652.43

ALTERNATE - 2

EVALUATION - 11

We assume:

- All variables as in Evaluation 1.
- Loan interest 10%.

Results:

- Rates of return on  
total investment ..... < 0,2%
- Pay-back period ..... > 11 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	505.44	683.35	874.69	1080.25	1182.59	1229.89	1279.09	1330.25	1383.46	1438.80
2. TOTAL RAW MATERIAL COST	-475.12	-648.55	-838.12	-1045.03	-1155.03	-1212.79	-1273.43	-1337.10	-1403.95	-1474.15
3. OPERATING MARGIN (1+2)	30.32	34.81	36.57	35.22	27.55	17.10	5.66	-6.85	-20.49	-35.35
4. UTILITIES COST	-51.63	-69.13	-87.64	-107.19	-116.22	-119.70	-123.29	-126.99	-130.80	-134.73
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-495.60	-520.38	-546.40	-573.72	-602.40	-632.53	-664.15	-697.36	-732.23	-768.84
CATEGORY-C	-206.85	-217.19	-228.05	-239.45	-251.43	-264.00	-277.20	-291.06	-305.61	-320.89
CATEGORY-D	-105.00	-110.25	-115.76	-121.55	-127.63	-134.01	-140.71	-147.75	-155.13	-162.89
TOTAL LABOUR COST	-960.75	-1008.79	-1059.23	-1112.19	-1167.80	-1226.19	-1287.50	-1351.87	-1419.47	-1490.44
6. OVERHEAD COST	-48.04	-50.44	-52.96	-55.61	-58.39	-61.31	-64.37	-67.59	-70.97	-74.52
7. INSURANCE COST	-33.17	-34.16	-35.19	-36.24	-37.33	-38.45	-39.60	-40.79	-42.01	-43.27
8. MAINTENANCE-REPAIR COST	-199.00	-204.97	-211.11	-217.45	-223.97	-230.69	-237.61	-244.74	-252.08	-259.64
9. MARKETING COST	-15.16	-20.50	-26.24	-32.41	-35.48	-36.90	-38.37	-39.91	-41.50	-43.16
10. INDUSTRIAL COST (4+5+6+7+8+9)	-1307.74	-1387.99	-1472.37	-1561.09	-1639.18	-1713.24	-1790.75	-1871.90	-1956.84	-2045.77
11. INDUSTRIAL MARGIN (3+10)	-1277.43	-1353.18	-1435.79	-1525.87	-1611.63	-1696.13	-1785.09	-1878.74	-1977.33	-2081.12
12. DEPRECIATION COST-A (EQUIPMENT)	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50	-440.50
13. DEPRECIATION COST-B (BUILDINGS)	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75	-101.75
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	6440.00	6440.00	6440.00	6440.00	6035.92	5591.43	5102.49	4564.66	3973.05	3322.27
15. INTEREST COST	1932.00	644.00	644.00	644.00	603.59	559.14	510.25	456.47	397.30	332.23
16. AMORTIZATION FEE				1048.08	1048.08	1048.08	1048.08	1048.08	1048.08	1048.08
17. AMORTIZATION OF LOAN				404.08	444.49	488.94	537.83	591.61	650.78	715.85
18. ACCUMULATED AMORTIZATION OF LOAN				404.08	848.57	1337.51	1875.34	2466.95	3117.73	3833.58
19. PRODUCTION COSTS (2+10+12+13-15)	-4257.12	-3222.78	-3496.74	-3792.37	-3940.06	-4027.42	-4116.68	-4207.71	-4300.35	-4394.40
20. GROSS PROFIT (1+19)	-3751.68	-2539.43	-2622.04	-2712.12	-2757.47	-2797.53	-2837.59	-2877.46	-2916.89	-2955.60
21. CORPORATE TAX										
22. NET PROFIT	-3751.68	-2539.43	-2622.04	-2712.12	-2757.47	-2797.53	-2837.59	-2877.46	-2916.89	-2955.60

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	-1277.43	-1353.18	-1435.79	-1525.87	-1611.63	-1696.13	-1785.09	-1878.74	-1977.33	-2081.12
INTEREST COST (15)	1932.00	644.00	644.00	644.00	603.59	559.14	510.25	456.47	397.30	332.23
AMORTIZATION OF LOAN (17)				404.08	444.49	488.94	537.83	591.61	650.78	715.85
A. WORKING CAPITAL	1446.42	1143.20	1279.27	1425.94	1499.26	1539.62	1581.07	1623.59	1667.14	1711.67
B. CASH FLOW (11-15-17)	-3209.43	-1997.18	-2079.79	-2573.95	-2659.71	-2744.21	-2833.17	-2926.82	-3025.42	-3129.20
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-3115.95	-1882.53	-1903.30	-2286.92	-2294.29	-2298.24	-2303.63	-2310.46	-2318.73	-2328.42
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-3115.95	-4998.48	-6901.78	-9188.70	-11482.99	-13781.23	-16084.86	-18395.32	-20714.05	-23042.47
F. PAY OUT TIME	11.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	505.44	683.35	874.69	1080.25	1182.59	1229.89	1279.09	1330.25	1383.46	1438.80
PRODUCTION COSTS (19)	-4257.12	-3222.78	-3496.74	-3792.37	-3940.06	-4027.42	-4116.68	-4207.71	-4300.35	-4394.40
GROSS PROFIT (20)	-3751.68	-2539.43	-2622.04	-2712.12	-2757.47	-2797.53	-2837.59	-2877.46	-2916.89	-2955.60
CORPORATE TAX (21)										
NET PROFIT (22)	-3751.68	-2539.43	-2622.04	-2712.12	-2757.47	-2797.53	-2837.59	-2877.46	-2916.89	-2955.60
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-3751.68	-2539.43	-2622.04	-2712.12	-2757.47	-2797.53	-2837.59	-2877.46	-2916.89	-2955.60
ACUMULATED UNDISTRICTED PROFITS	-3751.68	-6291.10	-8913.15	-11625.26	-14382.74	-17180.26	-20017.86	-22895.32	-25812.21	-28767.81
TOTAL INVESTMENT	6440.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

A L T E R N A T E - 3

E V A L U A T I O N - 1

We assume:

- Most likely values.
- Current prices.

Results:

- Rates of return on  
total investment ..... 5,4%
- Pay-back period ..... 5 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	3236.48	4375.72	5600.92	6917.14	7572.45	7875.35	8190.36	8517.97	8858.69	9213.04
2. TOTAL RAW MATERIAL COST	-648.37	-885.03	-1143.73	-1426.09	-1576.21	-1655.02	-1737.77	-1824.66	-1915.89	-2011.68
3. OPERATING MARGIN (1+2)	2588.10	3490.69	4457.19	5491.05	5996.24	6220.33	6452.59	6693.32	6942.80	7201.36
4. UTILITIES COST	-259.75	-353.00	-454.20	-563.90	-620.62	-648.94	-678.59	-709.65	-742.16	-776.22
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1040.55	-1092.58	-1147.21	-1204.57	-1264.80	-1328.03	-1394.44	-1464.16	-1537.37	-1614.23
CATEGORY-C	-266.70	-280.03	-294.04	-308.74	-324.18	-340.38	-357.40	-375.27	-394.04	-413.74
CATEGORY-D	-220.50	-231.52	-243.10	-255.26	-268.02	-281.42	-295.49	-310.27	-325.78	-342.07
TOTAL LABOUR COST	-1681.05	-1765.10	-1853.36	-1946.03	-2043.33	-2145.49	-2252.77	-2365.41	-2483.68	-2607.86
6. OVERHEAD COST	-84.05	-88.26	-92.67	-97.30	-102.17	-107.27	-112.64	-118.27	-124.18	-130.39
7. INSURANCE COST	-40.59	-41.81	-43.06	-44.36	-45.69	-47.06	-48.47	-49.92	-51.42	-52.96
8. MAINTENANCE-REPAIR COST	-243.55	-250.86	-258.39	-266.14	-274.12	-282.35	-290.82	-299.54	-308.53	-317.78
9. MARKETING COST	-97.09	-131.27	-168.03	-207.51	-227.17	-236.26	-245.71	-255.54	-265.76	-276.39
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2406.10	-2630.30	-2869.70	-3125.23	-3313.10	-3467.37	-3629.00	-3798.32	-3975.73	-4161.61
11. INDUSTRIAL MARGIN (3+10)	182.01	860.39	1587.49	2365.81	2683.14	2752.96	2823.59	2894.99	2967.07	3039.75
12. DEPRECIATION COST-A (EQUIPMENT)	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10
13. DEPRECIATION COST-B (BUILDINGS)	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	7882.00	7882.00	7882.00	7882.00	7311.52	6701.11	6047.97	5349.10	4601.32	3801.19
15. INTEREST COST	1655.22	551.74	551.74	551.74	511.81	469.08	423.36	374.44	322.09	266.08
16. AMORTIZATION FEE				1122.22	1122.22	1122.22	1122.22	1122.22	1122.22	1122.22
17. AMORTIZATION OF LOAN				570.48	610.41	653.14	698.86	747.78	800.13	856.14
18. ACUMULATED AMORTIZATION OF LOAN				570.48	1180.89	1834.03	2532.90	3280.68	4080.81	4936.94
19. PRODUCTION COSTS (2+10+12+13-15)	-5390.34	-4747.72	-5245.82	-5783.72	-6081.76	-6272.12	-6470.77	-6678.07	-6894.36	-7120.03
20. GROSS PROFIT (1+19)	-2153.86	-372.00	355.10	1133.42	1490.69	1603.23	1719.59	1839.90	1964.33	2093.01
21. CORPORATE TAX										
22. NET PROFIT	-2153.86	-372.00	355.10	1133.42	1490.69	1603.23	1719.59	1839.90	1964.33	2093.01

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLE</b>										
*****										
INDUSTRIAL MARGIN (11)	182.01	860.39	1587.49	2365.81	2683.14	2752.96	2823.59	2894.99	2967.07	3039.75
INTEREST COST (15)	1655.22	551.74	551.74	551.74	511.81	469.08	423.36	374.44	322.09	266.08
AMORTIZATION OF LOAN (17)				570.48	610.41	653.14	698.86	747.78	800.13	856.14
A. WORKING CAPITAL	2449.17	2504.23	2959.70	3449.77	3703.49	3837.94	3977.97	4123.80	4275.66	4433.79
B. CASH FLOW (11-15-17)	-1473.21	308.65	1035.75	1243.59	1560.92	1630.74	1701.38	1772.77	1844.85	1917.53
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-1430.30	290.93	947.84	1104.92	1346.47	1365.72	1383.37	1399.44	1413.92	1426.82
E. ACCUMULATED CASH FLOW AT DEVALUATION RATE	-1430.30	-1139.37	-191.51	913.40	2259.87	3625.58	5008.96	6408.40	7822.33	9249.15
F. PAY OUT TIME	4.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	3236.48	4375.72	5600.92	6917.14	7572.45	7875.35	8190.36	8517.97	8858.69	9213.04
PRODUCTION COSTS (19)	-5390.34	-4747.72	-5245.82	-5783.72	-6081.76	-6272.12	-6470.77	-6678.07	-6894.36	-7120.03
GROSS PROFIT (20)	-2153.86	-372.00	355.10	1133.42	1490.69	1603.23	1719.59	1839.90	1964.33	2093.01
CORPORATE TAX (21)										
NET PROFIT (22)	-2153.86	-372.00	355.10	1133.42	1490.69	1603.23	1719.59	1839.90	1964.33	2093.01
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-2153.86	-372.00	355.10	1133.42	1490.69	1603.23	1719.59	1839.90	1964.33	2093.01
ACCUMULATED UNDISTRIUTED PROFITS	-2153.86	-2525.86	-2170.76	-1037.34	453.35	2056.57	3776.16	5616.07	7580.39	9673.41
TOTAL INVESTMENT	7882.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	5.40									

ALTERNATE - 3

EVALUATION - 2

We assume:

- All variables as in Evaluation 1.
- 10% increase in sales.

Results:

- Rates of return on  
total investment ..... 13,4%
- Pay-back period ..... 3 years



	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	3559.92	4813.01	6160.66	7608.41	8329.21	8662.37	9008.87	9369.22	9743.99	10133.75
2. TOTAL RAW MATERIAL COST	-648.37	-885.03	-1143.73	-1426.09	-1576.21	-1655.02	-1737.77	-1824.66	-1915.89	-2011.68
3. OPERATING MARGIN (1+2)	2911.54	3927.98	5016.92	6182.32	6753.00	7007.36	7271.10	7544.57	7828.10	8122.07
4. UTILITIES COST	-259.75	-353.00	-454.20	-563.90	-620.62	-648.94	-678.59	-709.65	-742.16	-776.22
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1040.55	-1092.58	-1147.21	-1204.57	-1264.80	-1328.03	-1394.44	-1464.16	-1537.37	-1614.23
CATEGORY-C	-266.70	-280.03	-294.04	-308.74	-324.18	-340.38	-357.40	-375.27	-394.04	-413.74
CATEGORY-D	-220.50	-231.52	-243.10	-255.26	-268.02	-281.42	-295.49	-310.27	-325.78	-342.07
TOTAL LABOUR COST	-1681.05	-1765.10	-1853.36	-1946.03	-2043.33	-2145.49	-2252.77	-2365.41	-2483.68	-2607.86
6. OVERHEAD COST	-84.05	-88.26	-92.67	-97.30	-102.17	-107.27	-112.64	-118.27	-124.18	-130.39
7. INSURANCE COST	-40.59	-41.81	-43.04	-44.36	-45.69	-47.06	-48.47	-49.92	-51.42	-52.96
8. MAINTENANCE-REPAIR COST	-243.55	-250.86	-258.39	-266.14	-274.12	-282.35	-290.82	-299.54	-308.53	-317.78
9. MARKETING COST	-106.80	-144.39	-184.82	-228.25	-249.88	-259.87	-270.27	-281.08	-292.32	-304.01
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2415.80	-2643.42	-2886.49	-3145.97	-3335.80	-3490.98	-3653.55	-3823.86	-4002.29	-4189.23
11. INDUSTRIAL MARGIN (3+10)	495.74	1284.56	2130.43	3036.35	3417.20	3516.37	3617.55	3720.70	3825.81	3932.84
12. DEPRECIATION COST-A (EQUIPMENT)	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10
13. DEPRECIATION COST-B (BUILDINGS)	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	7882.00	7882.00	7882.00	7882.00	7311.52	6701.11	6047.97	5349.10	4601.32	3801.19
15. INTEREST COST	1655.22	551.74	551.74	551.74	511.81	469.08	423.36	374.44	322.09	266.08
16. AMORTIZATION FEE				1122.22	1122.22	1122.22	1122.22	1122.22	1122.22	1122.22
17. AMORTIZATION OF LOAN				570.48	610.41	653.14	698.86	747.78	800.13	856.14
18. ACUMULATED AMORTIZATION OF LOAN				570.48	1180.89	1834.03	2532.90	3280.68	4080.81	4936.94
19. PRODUCTION COSTS (2+10+12+13-15)	-5400.05	-4760.84	-5262.62	-5804.45	-6104.46	-6295.73	-6495.33	-6703.61	-6920.92	-7147.65
20. GROSS PROFIT (1+19)	-1840.13	52.17	898.04	1803.96	2224.74	2366.65	2513.54	2665.62	2823.07	2986.10
21. CORPORATE TAX										
22. NET PROFIT	-1840.13	52.17	898.04	1803.96	2224.74	2366.65	2513.54	2665.62	2823.07	2986.10

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	495.74	1284.56	2130.43	3036.35	3417.20	3516.37	3617.55	3720.70	3825.81	3932.84
INTEREST COST (15)	1655.22	551.74	551.74	551.74	511.81	469.08	423.36	374.44	322.09	266.08
AMORTIZATION OF LOAN (17)				570.48	610.41	653.14	698.86	747.78	800.13	856.14
A. WORKING CAPITAL	2533.26	2617.92	3105.23	3629.50	3900.24	4042.57	4190.79	4345.13	4505.84	4673.18
B. CASH FLOW (11-15-17)	-1159.48	732.82	1578.69	1914.13	2294.98	2394.15	2495.33	2598.48	2703.59	2810.62
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-1125.71	690.76	1444.72	1700.68	1979.67	2005.07	2028.93	2051.27	2072.08	2091.36
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-1125.71	-434.95	1009.77	2710.45	4690.12	6695.18	8724.12	10775.38	12847.46	14938.83
F. PAY OUT TIME	3.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	3559.92	4813.01	6160.66	7608.41	8329.21	8662.37	9008.87	9369.22	9743.99	10133.75
PRODUCTION COSTS (19)	-5400.05	-4760.84	-5262.62	-5804.45	-6104.46	-6295.73	-6495.33	-6703.61	-6920.92	-7147.65
GROSS PROFIT (20)	-1840.13	52.17	898.04	1803.96	2224.74	2366.65	2513.54	2665.62	2823.07	2986.10
CORPORATE TAX (21)										
NET PROFIT (22)	-1840.13	52.17	898.04	1803.96	2224.74	2366.65	2513.54	2665.62	2823.07	2986.10
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-1840.13	52.17	898.04	1803.96	2224.74	2366.65	2513.54	2665.62	2823.07	2986.10
ACUMULATED UNDISTRIBUTED PROFITS	-1840.13	-1787.95	-889.91	914.04	3138.78	5505.43	8018.97	10684.59	13507.65	16493.76
TOTAL INVESTMENT	7882.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	13.40									

A L T E R N A T E - 3

E V A L U A T I O N - 3

We assume:

- All variables as in Evaluation 1
- 5% increase in sales.

Results:

- Rates of return on  
total investment ..... 9,6%
- Pay-back period ..... 3 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	3398.20	4594.37	5880.79	7262.77	7950.83	8268.86	8599.61	8943.60	9301.34	9673.40
2. TOTAL RAW MATERIAL COST	-648.37	-885.03	-1143.73	-1426.09	-1576.21	-1655.02	-1737.77	-1824.66	-1915.89	-2011.68
3. OPERATING MARGIN (1+2)	2749.82	3709.33	4737.06	5836.68	6374.62	6613.84	6861.85	7118.94	7385.45	7661.71
4. UTILITIES COST	-259.75	-353.00	-454.20	-563.90	-620.62	-648.94	-678.59	-709.65	-742.16	-776.22
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1040.55	-1092.58	-1147.21	-1204.57	-1264.80	-1328.03	-1394.44	-1464.16	-1537.37	-1614.23
CATEGORY-C	-266.70	-280.03	-294.04	-308.74	-324.18	-340.38	-357.40	-375.27	-394.04	-413.74
CATEGORY-D	-220.50	-231.52	-243.10	-255.26	-268.02	-281.42	-295.49	-310.27	-325.78	-342.07
TOTAL LABOUR COST	-1681.05	-1765.10	-1853.36	-1946.03	-2043.33	-2145.49	-2252.77	-2365.41	-2483.68	-2607.86
6. OVERHEAD COST	-84.05	-88.26	-92.67	-97.30	-102.17	-107.27	-112.64	-118.27	-124.18	-130.37
7. INSURANCE COST	-40.59	-41.81	-43.06	-44.36	-45.69	-47.06	-48.47	-49.92	-51.42	-52.96
8. MAINTENANCE-REPAIR COST	-243.55	-250.86	-258.39	-266.14	-274.12	-282.35	-290.82	-299.54	-308.53	-317.78
9. MARKETING COST	-101.95	-137.83	-176.42	-217.88	-238.52	-248.07	-257.99	-268.31	-279.04	-290.20
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2410.95	-2636.86	-2878.10	-3135.60	-3324.45	-3479.18	-3641.27	-3811.09	-3987.01	-4175.42
11. INDUSTRIAL MARGIN (3+10)	338.88	1072.48	1858.96	2701.08	3050.17	3134.66	3220.57	3307.85	3396.44	3486.29
12. DEPRECIATION COST-A (EQUIPMENT)	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10
13. DEPRECIATION COST-B (BUILDINGS)	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	7882.00	7882.00	7882.00	7882.00	7311.52	6701.11	6047.97	5349.10	4601.32	3801.19
15. INTEREST COST	1655.22	551.74	551.74	551.74	511.81	469.08	423.36	374.44	322.09	266.08
16. AMORTIZATION FEE				1122.22	1122.22	1122.22	1122.22	1122.22	1122.22	1122.22
17. AMORTIZATION OF LOAN				570.48	610.41	653.14	698.86	747.78	800.13	856.14
18. ACUMULATED AMORTIZATION OF LOAN				570.48	1180.89	1834.03	2532.90	3280.68	4080.81	4936.94
19. PRODUCTION COSTS (2+10+12+13-15)	-5395.19	-4754.28	-5254.22	-5794.08	-6093.11	-6283.92	-6483.05	-6690.84	-6907.64	-7133.84
20. GROSS PROFIT (1+19)	-1996.99	-159.91	626.57	1468.69	1857.71	1984.94	2116.56	2252.76	2393.70	2539.56
21. CORPORATE TAX										
22. NET PROFIT	-1996.99	-159.91	626.57	1468.69	1857.71	1984.94	2116.56	2252.76	2393.70	2539.56

	1	2	3
<b>FOSTER WHEELER IBERIA</b>			
<b>CASH FLOW TABLES</b>			
*****			
INDUSTRIAL MARGIN (11)	338.88	1072.48	1858.96
INTEREST COST (15)	1655.22	551.74	551.74
AMORTIZATION OF LOAN (17)			
A. WORKING CAPITAL	2491.21	2561.08	3032.46
B. CASH FLOW (11-15-17)	-1316.34	520.74	1307.22
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-1278.00	490.84	1196.29
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-1278.00	-787.16	409.13
F. PAY OUT TIME	3.00		
<b>NET INCOME STATEMENT</b>			
TOTAL SALES (1)	3398.20	4594.37	5880.79
PRODUCTION COSTS (19)	-5395.19	-4754.28	-5254.22
GROSS PROFIT (20)	-1996.99	-159.91	626.57
CORPORATE TAX (21)			
NET PROFIT (22)	-1996.99	-159.91	626.57
DIVIDENDS ON EQUITY UNDISTRIBUTED PROFITS	-1996.99	-159.91	626.57
ACUMULATED UNDISTRICTED PROFITS	-1996.99	-2156.91	-1530.34
TOTAL INVESTMENT	7882.00		
<b>RATIOS</b>			
RATE OF RETURN ON TOTAL INVESTMENT	9.60		

4	5	6	7	8	9	10
2701.08	3050.17	3134.66	3220.57	3307.85	3396.44	3486.29
551.74	511.81	469.08	423.36	374.44	322.09	266.08
570.48	610.41	653.14	698.86	747.78	800.13	856.14
3539.63	3801.87	3940.26	4084.38	4234.46	4390.75	4553.48
1578.86	1927.95	2012.44	2098.35	2185.63	2274.22	2364.07
0.89	0.86	0.84	0.81	0.79	0.77	0.74
1402.80	1663.07	1685.39	1706.15	1725.36	1743.00	1759.09
1811.93	3474.99	5160.38	6866.54	8591.89	10334.89	12090.99
7262.77	7950.83	8268.86	8599.61	8943.60	9301.34	9673.40
5794.08	-6093.11	-6283.92	-6483.05	-6690.84	-6907.64	-7133.84
1468.69	1857.71	1984.94	2116.56	2252.76	2393.70	2539.56
1468.69	1857.71	1984.94	2116.56	2252.76	2393.70	2539.56
1468.69	1857.71	1984.94	2116.56	2252.76	2393.70	2539.56
-61.65	1796.06	3781.00	5897.56	8150.33	10544.02	13083.58

A L T E R N A T E - 3

E V A L U A T I O N - 4

We assume:

- All variables as in Evaluation 1.
- 5% decrease in sales.

Results:

- Rates of return on  
total investment ..... 0,4%
- Pay-back period ..... 4 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	3074.76	4157.08	5321.06	6571.50	7194.07	7481.83	7781.10	8092.35	8416.04	8752.68
2. TOTAL RAW MATERIAL COST	-648.37	-885.03	-1143.73	-1426.09	-1576.21	-1655.02	-1737.77	-1824.66	-1915.89	-2011.68
3. OPERATING MARGIN (1+2)	2426.38	3272.04	4177.32	5145.41	5617.86	5826.81	6043.34	6267.69	6500.15	6741.00
4. UTILITIES COST	-259.75	-353.00	-454.20	-563.90	-620.62	-648.94	-678.59	-709.65	-742.16	-776.22
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1040.55	-1092.58	-1147.21	-1204.57	-1264.80	-1328.03	-1394.44	-1464.16	-1537.37	-1614.23
CATEGORY-C	-266.70	-280.03	-294.04	-308.74	-324.18	-340.38	-357.40	-375.27	-394.04	-413.74
CATEGORY-D	-220.50	-231.52	-243.10	-255.26	-268.02	-281.42	-295.49	-310.27	-325.78	-342.07
TOTAL LABOUR COST	-1681.05	-1765.10	-1853.36	-1946.03	-2043.33	-2145.49	-2252.77	-2365.41	-2483.68	-2607.86
6. OVERHEAD COST	-84.05	-88.26	-92.67	-97.30	-102.17	-107.27	-112.64	-118.27	-124.18	-130.39
7. INSURANCE COST	-40.59	-41.81	-43.06	-44.36	-45.69	-47.06	-48.47	-49.92	-51.42	-52.96
8. MAINTENANCE-REPAIR COST	-243.55	-250.86	-258.39	-266.14	-274.12	-282.35	-290.82	-299.54	-308.53	-317.78
9. MARKETING COST	-92.24	-124.71	-159.63	-197.15	-215.82	-224.45	-233.43	-242.77	-252.48	-262.58
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2401.25	-2623.74	-2861.31	-3114.86	-3301.75	-3455.57	-3616.72	-3785.56	-3962.45	-4147.80
11. INDUSTRIAL MARGIN (3+10)	25.14	648.30	1316.02	2030.55	2316.11	2371.25	2426.62	2482.14	2537.70	2593.20
12. DEPRECIATION COST-A (EQUIPMENT)	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10
13. DEPRECIATION COST-B (BUILDINGS)	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	7882.00	7882.00	7882.00	7882.00	7311.52	6701.11	6047.97	5349.10	4601.32	3801.19
15. INTEREST COST	1655.22	551.74	551.74	551.74	511.01	469.08	423.36	374.44	322.09	266.08
16. AMORTIZATION FEE				1122.22	1122.22	1122.22	1122.22	1122.22	1122.22	1122.22
17. AMORTIZATION OF LOAN				570.48	610.41	653.14	698.86	747.78	800.13	856.14
18. ACUMULATED AMORTIZATION OF LOAN				570.48	1180.89	1834.03	2532.90	3280.68	4080.81	4936.94
19. PRODUCTION COSTS (2+10+12+13-15)	-5385.49	-4741.16	-5237.43	-5773.35	-6070.41	-6260.31	-6458.49	-6665.30	-6881.09	-7106.22
20. GROSS PROFIT (1+19)	-2310.73	-584.09	83.63	798.16	1123.66	1221.52	1322.61	1427.05	1534.96	1646.47
21. CORPORATE TAX										
22. NET PROFIT	-2310.73	-584.09	83.63	798.16	1123.66	1221.52	1322.61	1427.05	1534.96	1646.47



	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	25.14	648.30	1316.02	2030.55	2316.11	2371.25	2426.62	2482.14	2537.70	2593.20
INTEREST COST (15)	1655.22	551.74	551.74	551.74	511.81	469.08	423.36	374.44	322.09	266.08
AMORTIZATION OF LOAN (17)				570.48	610.41	653.14	698.86	747.78	800.13	856.14
A. WORKING CAPITAL	2407.12	2447.38	2886.93	3359.90	3605.11	3735.63	3871.57	4013.14	4160.57	4314.10
B. CASH FLOW (11-15-17)	-1630.08	96.56	764.28	908.33	1193.90	1249.03	1304.40	1359.92	1415.48	1470.98
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-1582.60	91.02	699.42	807.04	1029.86	1046.04	1060.60	1073.53	1084.85	1094.55
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-1582.60	-1491.58	-792.16	14.88	1044.74	2090.78	3151.38	4224.91	5309.76	6404.31
F. PAY OUT TIME	4.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	3074.76	4157.08	5321.06	6571.50	7194.07	7481.83	7781.10	8092.35	8416.04	8752.68
PRODUCTION COSTS (19)	-5385.49	-4741.16	-5237.43	-5773.35	-6070.41	-6260.31	-6458.49	-6665.30	-6881.09	-7106.22
GROSS PROFIT (20)	-2310.73	-584.09	83.63	798.16	1123.66	1221.52	1322.61	1427.05	1534.96	1646.47
CORPORATE TAX (21)										
NET PROFIT (22)	-2310.73	-584.09	83.63	798.16	1123.66	1221.52	1322.61	1427.05	1534.96	1646.47
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-2310.73	-584.09	83.63	798.16	1123.66	1221.52	1322.61	1427.05	1534.96	1646.47
ACUMULATED UNDISTRIBUTED PROFITS	-2310.73	-2894.82	-2811.19	-2013.03	-889.37	332.15	1654.76	3081.80	4616.76	6263.23
TOTAL INVESTMENT	7882.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.40									

A L T E R N A T E - 3

E V A L U A T I O N - 5

We assume:

- All variables as in Evaluation 1.
- 10% decrease in sales.

Results:

- Rates of return on  
total investment ..... --
- Pay-back period ..... 6 years

	1	2	3	4
<b>FOSTER WHEELER IBERIA</b>				
-----				
<b>PRODUCTION COSTS AND</b>				
<b>NET INCOME STATEMENT</b>				
<b>IN THOUSAND DOLLARS</b>				
*****				
1. TOTAL SALES	2913.04	3938.43	5041.19	6225.87
2. TOTAL RAW MATERIAL COST	-648.37	-885.03	-1143.73	-1426.09
3. OPERATING MARGIN (1+2)	2264.66	3053.40	3897.46	4799.78
4. UTILITIES COST	-259.75	-353.00	-454.20	-563.90
5. LABOUR COST				
CATEGORY-A	-153.30	-160.96	-169.01	-177.46
CATEGORY-B	-1040.55	-1092.58	-1147.21	-1204.57
CATEGORY-C	-266.70	-280.03	-294.04	-308.74
CATEGORY-D	-220.50	-231.52	-243.10	-255.26
TOTAL LABOUR COST	-1681.05	-1765.10	-1853.36	-1946.03
6. OVERHEAD COST	-84.05	-88.26	-92.67	-97.30
7. INSURANCE COST	-40.59	-41.81	-43.06	-44.36
8. MAINTENANCE-REPAIR COST	-243.55	-250.86	-258.39	-266.14
9. MARKETING COST	-87.39	-118.15	-151.24	-186.78
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2396.39	-2617.18	-2852.91	-3104.50
11. INDUSTRIAL MARGIN (3+10)	-131.73	436.22	1044.55	1695.28
12. DEPRECIATION COST-A (EQUIPMENT)	-573.10	-573.10	-573.10	-573.10
13. DEPRECIATION COST-B (BUILDINGS)	-107.55	-107.55	-107.55	-107.55
<b>BANK LOANS</b>				
14. OUTSTANDING BALANCE OF LOAN	7882.00	7882.00	7882.00	7882.00
15. INTEREST COST	1655.22	551.74	551.74	551.74
16. AMORTIZATION FEE				1122.22
17. AMORTIZATION OF LOAN				570.48
18. ACUMULATED AMORTIZATION OF LOAN				570.48
19. PRODUCTION COSTS (2+10+12+13-15)	-5380.64	-4734.60	-5229.03	-5762.98
20. GROSS PROFIT (1+19)	-2467.60	-796.17	-187.84	462.89
21. CORPORATE TAX				
22. NET PROFIT	-2467.60	-796.17	-187.84	462.89

5	6	7	8	9	10
6815.69	7088.32	7371.85	7666.72	7973.39	8292.33
-1576.21	-1655.02	-1737.77	-1824.66	-1915.89	-2011.68
5239.48	5433.30	5634.08	5842.07	6057.50	6280.64
-620.62	-648.94	-678.59	-709.65	-742.16	-776.22
-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
-1264.80	-1328.03	-1394.44	-1464.16	-1537.37	-1614.23
-324.18	-340.38	-357.40	-375.27	-394.04	-413.74
-268.02	-281.42	-295.49	-310.27	-325.78	-342.07
-2043.33	-2145.49	-2252.77	-2365.41	-2483.68	-2607.86
-102.17	-107.27	-112.64	-118.27	-124.18	-130.39
-45.69	-47.06	-48.47	-49.92	-51.42	-52.96
-274.12	-282.35	-290.82	-299.54	-308.53	-317.78
-204.47	-212.65	-221.16	-230.00	-239.20	-248.77
-3290.39	-3443.76	-3604.44	-3772.79	-3949.17	-4133.99
1949.09	1989.54	2029.64	2069.28	2108.33	2146.66
-573.10	-573.10	-573.10	-573.10	-573.10	-573.10
-107.55	-107.55	-107.55	-107.55	-107.55	-107.55
7311.52	6701.11	6047.97	5349.10	4601.32	3801.19
511.81	469.08	423.36	374.44	322.09	266.08
1122.22	1122.22	1122.22	1122.22	1122.22	1122.22
610.41	653.14	698.86	747.78	800.13	856.14
1180.89	1834.03	2532.90	3280.68	4080.81	4936.94
-6059.06	-6248.51	-6446.22	-6652.53	-6867.81	-7092.41
756.63	839.81	925.63	1014.19	1105.59	1199.92
756.63	839.81	925.63	1014.19	1105.59	1199.92

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
*****										
INDUSTRIAL MARGIN (11)	-131.73	436.22	1044.55	1695.28	1949.09	1989.54	2029.64	2069.28	2108.33	2146.66
INTEREST COST (15)	1655.22	551.74	551.74	551.74	511.81	469.08	423.36	374.44	322.09	266.08
AMORTIZATION OF LOAN (17)				570.48	610.41	653.14	698.86	747.78	800.13	856.14
A. WORKING CAPITAL	2365.07	2390.53	2814.17	3270.04	3506.71	3633.32	3765.16	3902.48	4045.48	4194.41
B. CASH FLOW (11-15-17)	-1786.95	-115.52	492.81	573.06	826.87	867.32	907.42	947.06	986.11	1024.44
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-1734.90	-108.89	450.99	509.16	713.26	726.37	737.82	747.62	755.77	762.28
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-1734.90	-1843.79	-1392.80	-883.64	-170.38	555.98	1293.80	2041.42	2797.19	3559.47
F. PAY OUT TIME	6.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	2913.04	3938.43	5041.19	6225.87	6815.69	7088.32	7371.85	7666.72	7973.39	8292.33
PRODUCTION COSTS (19)	-5380.64	-4734.60	-5229.03	-5762.98	-6059.06	-6248.51	-6446.22	-6652.53	-6867.81	-7092.41
GROSS PROFIT (20)	-2467.60	-796.17	-187.84	462.89	756.63	839.81	925.63	1014.19	1105.59	1199.92
CORPORATE TAX (21)										
NET PROFIT (22)	-2467.60	-796.17	-187.84	462.89	756.63	839.81	925.63	1014.19	1105.59	1199.92
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-2467.60	-796.17	-187.84	462.89	756.63	839.81	925.63	1014.19	1105.59	1199.92
ACUMULATED UNDISTRIBUTED PROFITS	-2467.60	-3263.77	-3451.61	-2988.72	-2232.09	-1392.28	-466.65	547.54	1653.13	2853.05
TOTAL INVESTMENT	7882.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	0.20									

A L T E R N A T E - 3

E V A L U A T I O N - 6

We assume:

- All variables as in Evaluation 1.
- 10% increase in investment.

Results:

- Rates of return on  
total investment ..... 2,2%
- Pay-back period ..... 4 years

	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
-----										
PRODUCTION COSTS AND										
NET INCOME STATEMENT										
IN THOUSAND DOLLARS										
*****										
1. TOTAL SALES	3236.48	4375.72	5600.92	6917.14	7572.45	7875.35	8190.36	8517.97	8858.69	9213.04
2. TOTAL RAW MATERIAL COST	-648.37	-885.03	-1143.73	-1426.09	-1576.21	-1655.02	-1737.77	-1824.66	-1915.89	-2011.68
3. OPERATING MARGIN (1+2)	2588.10	3490.69	4457.19	5491.05	5996.24	6220.33	6452.59	6693.32	6942.80	7201.36
4. UTILITIES COST	-259.75	-353.00	-454.20	-563.90	-620.62	-648.94	-678.59	-709.65	-742.16	-776.22
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1040.55	-1092.58	-1147.21	-1204.57	-1264.80	-1328.03	-1394.44	-1464.16	-1537.37	-1614.23
CATEGORY-C	-266.70	-280.03	-294.04	-308.74	-324.18	-340.38	-357.40	-375.27	-394.04	-413.74
CATEGORY-D	-220.50	-231.52	-243.10	-255.26	-268.02	-281.42	-295.49	-310.27	-325.78	-342.07
TOTAL LABOUR COST	-1681.05	-1765.10	-1853.36	-1946.03	-2043.33	-2145.49	-2252.77	-2365.41	-2483.68	-2607.86
6. OVERHEAD COST	-84.05	-88.26	-92.67	-97.30	-102.17	-107.27	-112.64	-118.27	-124.18	-130.39
7. INSURANCE COST	-44.65	-45.99	-47.37	-48.79	-50.25	-51.76	-53.32	-54.91	-56.56	-58.26
8. MAINTENANCE-REPAIR COST	-267.90	-275.94	-284.22	-292.74	-301.53	-310.57	-319.89	-329.49	-339.37	-349.55
9. MARKETING COST	-97.09	-131.27	-168.03	-207.51	-227.17	-236.26	-245.71	-255.54	-265.76	-276.39
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2434.51	-2659.56	-2899.84	-3156.27	-3345.07	-3500.30	-3662.92	-3833.26	-4011.72	-4198.67
11. INDUSTRIAL MARGIN (3+10)	153.60	831.13	1557.35	2334.77	2651.17	2720.02	2789.67	2860.05	2931.08	3002.68
12. DEPRECIATION COST-A (EQUIPMENT)	-630.40	-630.40	-630.40	-630.40	-630.40	-630.40	-630.40	-630.40	-630.40	-630.40
13. DEPRECIATION COST-B (BUILDINGS)	-118.30	-118.30	-118.30	-118.30	-118.30	-118.30	-118.30	-118.30	-118.30	-118.30
BANK LOANS										
14. OUTSTANDING BALANCE OF LOAN	8670.00	8670.00	8670.00	8670.00	8042.49	7371.05	6652.61	5883.88	5061.34	4181.22
15. INTEREST COST	1820.70	606.90	606.90	606.90	562.97	515.97	465.68	411.87	354.29	292.69
16. AMORTIZATION FEE				1234.41	1234.41	1234.41	1234.41	1234.41	1234.41	1234.41
17. AMORTIZATION OF LOAN				627.51	671.44	718.44	768.73	822.54	880.12	941.73
18. ACUMULATED AMORTIZATION OF LOAN				627.51	1298.95	2017.39	2786.12	3608.66	4488.78	5430.51
19. PRODUCTION COSTS (2+10+12+13-15)	-5652.28	-4900.19	-5399.17	-5937.97	-6232.95	-6420.00	-6615.07	-6818.49	-7030.60	-7251.74
20. GROSS PROFIT (1+19)	-2415.80	-524.47	201.75	979.17	1339.50	1455.35	1575.29	1699.48	1828.09	1961.30
21. CORPORATE TAX										
22. NET PROFIT	-2415.80	-524.47	201.75	979.17	1339.50	1455.35	1575.29	1699.48	1828.09	1961.30

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	153.60	831.13	1557.35	2334.77	2651.17	2720.02	2789.67	2860.05	2931.08	3002.68
INTEREST COST (15)	1820.70	606.90	606.90	606.90	562.97	515.97	465.68	411.87	354.29	292.69
AMORTIZATION OF LOAN (17)				627.51	671.44	718.44	768.73	822.54	880.12	941.73
A. WORKING CAPITAL	2525.14	2543.71	2999.47	3489.84	3742.54	3875.89	4014.73	4159.27	4309.73	4466.36
B. CASH FLOW (11-15-17)	-1667.10	224.23	950.45	1100.36	1416.76	1485.61	1555.26	1625.64	1696.67	1768.27
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-1618.54	211.36	869.80	977.66	1222.11	1244.18	1264.57	1283.30	1300.36	1315.76
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-1618.54	-1407.19	-537.39	440.27	1662.37	2906.55	4171.12	5454.42	6754.77	8070.53
F. PAY OUT TIME	4.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	3236.48	4375.72	5600.92	6917.14	7572.45	7875.35	8190.36	8517.97	8858.69	9213.04
PRODUCTION COSTS (19)	-5652.28	-4900.19	-5399.17	-5937.97	-6232.95	-6420.00	-6615.07	-6818.49	-7030.60	-7251.74
GROSS PROFIT (20)	-2415.80	-524.47	201.75	979.17	1339.50	1455.35	1575.29	1699.48	1828.09	1961.30
CORPORATE TAX (21)										
NET PROFIT (22)	-2415.80	-524.47	201.75	979.17	1339.50	1455.35	1575.29	1699.48	1828.09	1961.30
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-2415.80	-524.47	201.75	979.17	1339.50	1455.35	1575.29	1699.48	1828.09	1961.30
ACUMULATED UNDISTRICTED PROFITS	-2415.80	-2940.27	-2738.52	-1759.35	-419.85	1035.50	2610.79	4310.27	6138.37	8099.66
TOTAL INVESTMENT	8670.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	2.20									



A L T E R N A T E - 3

E V A L U A T I O N - 7

We assume:

- All variables as in Evaluation 1.
- 10% decrease in investment.

Results:

- Rates of return on  
total investment ..... 8,8%
- Pay-back period ..... 3 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>PRODUCTION COSTS AND NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	3236.48	4375.72	5600.92	6917.14	7572.45	7875.35	8190.36	8517.97	8858.69	9213.04
2. TOTAL RAW MATERIAL COST	-648.37	-885.03	-1143.73	-1426.09	-1576.21	-1655.02	-1737.77	-1824.66	-1915.89	-2011.68
3. OPERATING MARGIN (1+2)	2588.10	3490.69	4457.19	5491.05	5996.24	6220.33	6452.59	6693.32	6942.80	7201.36
4. UTILITIES COST	-259.75	-353.00	-454.20	-563.90	-620.62	-648.94	-678.59	-709.65	-742.16	-776.22
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1040.55	-1092.58	-1147.21	-1204.57	-1264.80	-1328.03	-1394.44	-1464.16	-1537.37	-1614.23
CATEGORY-C	-266.70	-280.03	-294.04	-308.74	-324.18	-340.38	-357.40	-375.27	-394.04	-413.74
CATEGORY-D	-220.50	-231.52	-243.10	-255.26	-268.02	-281.42	-295.49	-310.27	-325.78	-342.07
TOTAL LABOUR COST	-1681.05	-1765.10	-1853.36	-1946.03	-2043.33	-2145.49	-2252.77	-2365.41	-2483.68	-2607.86
6. OVERHEAD COST	-84.05	-88.26	-92.67	-97.30	-102.17	-107.27	-112.64	-118.27	-124.18	-130.39
7. INSURANCE COST	-36.53	-37.63	-38.76	-39.92	-41.12	-42.35	-43.62	-44.93	-46.28	-47.67
8. MAINTENANCE-REPAIR COST	-219.20	-225.78	-232.55	-239.53	-246.72	-254.12	-261.74	-269.59	-277.68	-286.01
9. MARKETING COST	-97.09	-131.27	-168.03	-207.51	-227.17	-236.26	-245.71	-255.54	-265.76	-276.39
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2377.69	-2601.04	-2839.56	-3094.19	-3281.12	-3434.44	-3595.08	-3763.39	-3939.75	-4124.54
11. INDUSTRIAL MARGIN (3+10)	210.41	889.65	1617.63	2396.86	2715.12	2785.89	2857.51	2929.93	3003.06	3076.81
12. DEPRECIATION COST-A (EQUIPMENT)	-515.80	-515.80	-515.80	-515.80	-515.80	-515.80	-515.80	-515.80	-515.80	-515.80
13. DEPRECIATION COST-B (BUILDINGS)	-96.80	-96.80	-96.80	-96.80	-96.80	-96.80	-96.80	-96.80	-96.80	-96.80
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	7094.00	7094.00	7094.00	7094.00	6580.55	6031.17	5443.32	4814.33	4141.31	3421.17
15. INTEREST COST	1489.74	496.58	496.58	496.58	460.64	422.18	381.03	337.00	289.89	239.48
16. AMORTIZATION FEE				1010.03	1010.03	1010.03	1010.03	1010.03	1010.03	1010.03
17. AMORTIZATION OF LOAN				513.45	549.39	587.84	628.99	673.02	720.13	770.54
18. ACUMULATED AMORTIZATION OF LOAN				513.45	1062.83	1650.68	2279.67	2952.69	3672.83	4443.37
19. PRODUCTION COSTS (2+10+12+13-15)	-5128.41	-4595.25	-5092.48	-5629.46	-5930.57	-6124.24	-6326.48	-6537.65	-6758.13	-6988.31
20. GROSS PROFIT (1+19)	-1891.93	-219.53	508.45	1287.68	1641.88	1751.11	1863.88	1980.33	2100.56	2224.73
21. CORPORATE TAX										
22. NET PROFIT	-1891.93	-219.53	508.45	1287.68	1641.88	1751.11	1863.88	1980.33	2100.56	2224.73

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
INDUSTRIAL MARGIN (11)	210.41	889.65	1617.63	2396.86	2715.12	2785.89	2857.51	2929.93	3003.06	3076.81
INTEREST COST (15)	1489.74	496.58	496.58	496.58	460.64	422.18	381.03	337.00	289.89	239.48
AMORTIZATION OF LOAN (17)				513.45	549.39	587.84	628.99	673.02	720.13	770.54
A. WORKING CAPITAL	2373.20	2464.75	2919.92	3409.69	3664.43	3799.99	3941.22	4088.34	4241.59	4401.23
B. CASH FLOW (11-15-17)	-1279.33	393.07	1121.05	1386.83	1705.09	1775.86	1847.49	1919.90	1993.03	2066.79
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-1242.06	370.51	1025.92	1232.18	1470.82	1487.26	1502.18	1515.59	1527.49	1537.88
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-1242.06	-871.54	154.36	1386.54	2857.36	4344.62	5846.80	7362.39	8889.88	10427.76
F. PAY OUT TIME	3.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	3236.48	4375.72	5600.92	6917.14	7572.45	7875.35	8190.36	8517.97	8858.69	9213.04
PRODUCTION COSTS (19)	-5128.41	-4595.25	-5092.48	-5629.46	-5930.57	-6124.24	-6326.48	-6537.65	-6758.13	-6988.31
GROSS PROFIT (20)	-1891.93	-219.53	508.45	1287.68	1641.88	1751.11	1863.88	1980.33	2100.56	2224.73
CORPORATE TAX (21)										
NET PROFIT (22)	-1891.93	-219.53	508.45	1287.68	1641.88	1751.11	1863.88	1980.33	2100.56	2224.73
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-1891.93	-219.53	508.45	1287.68	1641.88	1751.11	1863.88	1980.33	2100.56	2224.73
ACUMULATED UNDISTRICTED PROFITS	-1891.93	-2111.46	-1603.01	-315.33	1326.54	3077.65	4941.53	6921.86	9022.42	11247.15
TOTAL INVESTMENT	7094.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	8.80									

A L T E R N A T E - 3

E V A L U A T I O N - 8

We assume:

- All variables as in Evaluation 1.
- 10% increase in salaries.

Results:

- Rates of return on  
total investment ..... 2,6%
- Pay-back period ..... 4 years

	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
-----										
PRODUCTION COSTS AND										
NET INCOME STATEMENT										
IN THOUSAND DOLLARS										
*****										
1. TOTAL SALES	3236.48	4375.72	5600.92	6917.14	7572.45	7875.35	8190.36	8517.97	8858.69	9213.04
2. TOTAL RAW MATERIAL COST	-648.37	-885.03	-1143.73	-1426.09	-1576.21	-1655.02	-1737.77	-1824.66	-1915.89	-2011.68
3. OPERATING MARGIN (1+2)	2588.10	3490.69	4457.19	5491.05	5996.24	6220.33	6452.59	6693.32	6942.80	7201.36
4. UTILITIES COST	-259.75	-353.00	-454.20	-563.90	-620.62	-648.94	-678.59	-709.65	-742.16	-776.22
5. LABOUR COST										
CATEGORY-A	-169.05	-177.50	-186.38	-195.70	-205.48	-215.76	-226.54	-237.87	-249.76	-262.25
CATEGORY-B	-1144.50	-1201.72	-1261.81	-1324.90	-1391.15	-1460.70	-1533.74	-1610.43	-1690.95	-1775.50
CATEGORY-C	-292.95	-307.60	-322.98	-339.13	-356.08	-373.89	-392.58	-412.21	-432.82	-454.46
CATEGORY-D	-220.50	-231.52	-243.10	-255.26	-268.02	-281.42	-295.49	-310.27	-325.78	-342.07
TOTAL LABOUR COST	-1827.00	-1918.35	-2014.27	-2114.98	-2220.73	-2331.77	-2448.35	-2570.77	-2699.31	-2834.28
6. OVERHEAD COST	-91.35	-95.92	-100.71	-105.75	-111.04	-116.59	-122.42	-128.54	-134.97	-141.71
7. INSURANCE COST	-40.59	-41.81	-43.06	-44.36	-45.69	-47.04	-48.47	-49.92	-51.42	-52.96
8. MAINTENANCE-REPAIR COST	-243.55	-250.86	-258.39	-266.14	-274.12	-282.35	-290.82	-299.54	-308.53	-317.78
9. MARKETING COST	-97.09	-131.27	-168.03	-207.51	-227.17	-236.26	-245.71	-255.54	-265.76	-276.39
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2559.35	-2791.21	-3038.66	-3302.64	-3499.37	-3662.96	-3834.36	-4013.96	-4202.15	-4399.35
11. INDUSTRIAL MARGIN (3+10)	28.76	699.48	1418.53	2188.41	2496.87	2557.37	2418.23	2679.36	2740.65	2802.01
12. DEPRECIATION COST-A (EQUIPMENT)	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10
13. DEPRECIATION COST-B (BUILDINGS)	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55
BANK LOANS										
14. OUTSTANDING BALANCE OF LOAN	7882.00	7882.00	7882.00	7882.00	7311.52	6701.11	6047.97	5349.10	4601.32	3801.19
15. INTEREST COST	1655.22	551.74	551.74	551.74	511.81	469.08	423.36	374.44	322.09	266.08
16. AMORTIZATION FEE				1122.22	1122.22	1122.22	1122.22	1122.22	1122.22	1122.22
17. AMORTIZATION OF LOAN				570.48	610.41	653.14	698.86	747.78	800.13	856.14
18. ACUMULATED AMORTIZATION OF LOAN				570.48	1180.89	1834.03	2532.90	3280.68	4080.81	4936.94
19. PRODUCTION COSTS (2+10+12+13-15)	-5543.59	-4908.63	-5414.78	-5961.12	-6268.04	-6467.70	-6676.14	-6893.70	-7120.78	-7357.76
20. GROSS PROFIT (1+19)	-2307.11	-532.91	186.14	956.02	1304.41	1407.64	1514.22	1624.27	1737.91	1855.28
21. CORPORATE TAX										
22. NET PROFIT	-2307.11	-532.91	186.14	956.02	1304.41	1407.64	1514.22	1624.27	1737.91	1855.28

	1	2	3	4	5	6	7	8	9	10
FOSTER WHEELER IBERIA										
-----										
CASH FLOW TABLES										
*****										
INDUSTRIAL MARGIN (11)	28.76	699.48	1418.53	2188.41	2496.87	2557.37	2618.23	2679.36	2740.65	2802.01
INTEREST COST (15)	1455.22	551.74	551.74	551.74	511.81	469.08	423.34	374.44	322.09	266.08
AMORTIZATION OF LOAN (17)				570.48	610.41	653.14	698.86	747.78	800.13	856.14
A. WORKING CAPITAL	2500.25	2557.87	3016.02	3508.90	3765.58	3903.14	4046.43	4195.68	4351.13	4513.04
B. CASH FLOW (11-15-17)	-1626.46	147.74	866.79	1066.19	1374.65	1435.15	1496.01	1557.14	1618.43	1679.79
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-1579.09	139.26	793.24	947.30	1185.78	1201.91	1216.39	1229.22	1240.40	1249.92
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-1579.09	-1439.83	-646.59	300.71	1486.49	2688.41	3904.80	5134.02	6374.41	7624.33
F. PAY OUT TIME	4.00									
NET INCOME STATEMENT										
-----										
TOTAL SALES (1)	3234.48	4375.72	5600.92	6917.14	7572.45	7875.35	8190.36	8517.97	8858.69	9213.04
PRODUCTION COSTS (19)	-5543.59	-4908.63	-5414.78	-5961.12	-6268.04	-6467.70	-6676.14	-6893.70	-7120.78	-7357.76
GROSS PROFIT (20)	-2307.11	-532.91	186.14	956.02	1304.41	1407.64	1514.22	1624.27	1737.91	1855.28
CORPORATE TAX (21)										
NET PROFIT (22)	-2307.11	-532.91	186.14	956.02	1304.41	1407.64	1514.22	1624.27	1737.91	1855.28
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-2307.11	-532.91	186.14	956.02	1304.41	1407.64	1514.22	1624.27	1737.91	1855.28
ACUMULATED UNDISTRICTED PROFITS	-2307.11	-2840.02	-2653.88	-1697.86	-393.44	1014.20	2528.42	4152.69	5890.60	7745.88
TOTAL INVESTMENT	7882.00									
RATIOS										
-----										
RATE OF RETURN ON TOTAL INVESTMENT	2.60									

A L T E R N A T E - 3

E V A L U A T I O N - 9

We assume:

- All variables as in Evaluation 1.
- 10% decrease in salaries.

Results:

- Rates of return on  
total investment ..... 7,8%
- Pay-back period ..... 3 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	3236.48	4375.72	5600.92	6917.14	7572.45	7875.35	8190.36	8517.97	8858.69	9213.04
2. TOTAL RAW MATERIAL COST	-648.37	-885.03	-1143.73	-1426.09	-1576.21	-1655.02	-1737.77	-1824.66	-1915.89	-2011.68
3. OPERATING MARGIN (1+2)	2588.10	3490.69	4457.19	5491.05	5996.24	6220.33	6452.59	6693.32	6942.80	7201.36
4. UTILITIES COST	-259.75	-353.00	-454.20	-563.90	-620.62	-648.94	-678.59	-709.65	-742.16	-776.22
5. LABOUR COST										
CATEGORY-A	-137.55	-144.43	-151.65	-159.23	-167.19	-175.55	-184.33	-193.55	-203.22	-213.39
CATEGORY-B	-936.60	-983.43	-1032.60	-1084.23	-1138.44	-1195.37	-1255.13	-1317.89	-1383.78	-1452.97
CATEGORY-C	-240.45	-252.47	-265.10	-278.35	-292.27	-306.88	-322.23	-338.34	-355.25	-373.02
CATEGORY-D	-220.50	-231.52	-243.10	-255.26	-268.02	-281.42	-295.49	-310.27	-325.78	-342.07
TOTAL LABOUR COST	-1535.10	-1611.85	-1692.45	-1777.07	-1865.92	-1959.22	-2057.18	-2160.04	-2268.04	-2381.44
6. OVERHEAD COST	-76.75	-80.59	-84.62	-88.85	-93.30	-97.96	-102.86	-108.00	-113.40	-119.07
7. INSURANCE COST	-40.59	-41.81	-43.06	-44.36	-45.69	-47.06	-48.47	-49.92	-51.42	-52.96
8. MAINTENANCE-REPAIR COST	-243.55	-250.86	-258.39	-266.14	-274.12	-282.35	-290.82	-299.54	-308.53	-317.78
9. MARKETING COST	-97.09	-131.27	-168.03	-207.51	-227.17	-236.26	-245.71	-255.54	-265.76	-276.39
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2252.85	-2469.39	-2700.75	-2947.83	-3126.82	-3271.78	-3423.63	-3582.69	-3749.32	-3923.87
11. INDUSTRIAL MARGIN (3+10)	335.25	1021.30	1756.44	2543.22	2869.42	2948.54	3028.96	3110.63	3193.49	3277.48
12. DEPRECIATION COST-A (EQUIPMENT)	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10
13. DEPRECIATION COST-B (BUILDINGS)	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	7882.00	7882.00	7882.00	7882.00	7311.52	6701.11	6047.97	5349.10	4601.32	3801.19
15. INTEREST COST	1655.22	551.74	551.74	551.74	511.81	469.08	423.36	374.44	322.09	266.08
16. AMORTIZATION FEE				1122.22	1122.22	1122.22	1122.22	1122.22	1122.22	1122.22
17. AMORTIZATION OF LOAN				570.48	610.41	653.14	698.86	747.78	800.13	856.14
18. ACUMULATED AMORTIZATION OF LOAN				570.48	1180.89	1834.03	2532.90	3280.68	4080.81	4936.94
19. PRODUCTION COSTS (2+10+12+13-15)	-5237.10	-4586.81	-5076.87	-5606.31	-5895.49	-6076.53	-6265.41	-6462.43	-6667.95	-6882.29
20. GROSS PROFIT (1+19)	-2000.62	-211.09	524.05	1310.83	1676.96	1798.82	1924.95	2055.54	2190.74	2330.75
21. CORPORATE TAX										
22. NET PROFIT	-2000.62	-211.09	524.05	1310.83	1676.96	1798.82	1924.95	2055.54	2190.74	2330.75



	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
***** INDUSTRIAL MARGIN (11)	335.25	1021.30	1756.44	2543.22	2869.42	2948.54	3028.96	3110.63	3193.49	3277.48
INTEREST COST (15)	1655.22	551.74	551.74	551.74	511.81	469.08	423.36	374.44	322.09	266.08
AMORTIZATION OF LOAN (17)				570.48	610.41	653.14	698.86	747.78	800.13	856.14
A. WORKING CAPITAL	2398.08	2450.59	2903.38	3390.63	3641.40	3772.75	3909.52	4051.92	4200.19	4354.55
B. CASH FLOW (11-15-17)	-1319.97	469.56	1204.70	1421.00	1747.20	1826.32	1906.74	1988.41	2071.27	2155.26
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-1281.52	442.61	1102.47	1262.54	1507.15	1529.52	1550.36	1569.67	1587.45	1603.72
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-1281.52	-838.91	263.56	1526.10	3033.24	4562.76	6113.12	7682.78	9270.24	10873.96
F. PAY OUT TIME	3.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	3236.48	4375.72	5600.92	6917.14	7572.45	7875.35	8190.36	8517.97	8858.69	9213.04
PRODUCTION COSTS (19)	-5237.10	-4586.81	-5076.87	-5606.31	-5895.49	-6076.53	-6265.41	-6462.43	-6667.95	-6882.29
GROSS PROFIT (20)	-2000.62	-211.09	524.05	1310.83	1676.96	1798.82	1924.95	2055.54	2190.74	2330.75
CORPORATE TAX (21)										
NET PROFIT (22)	-2000.62	-211.09	524.05	1310.83	1676.96	1798.82	1924.95	2055.54	2190.74	2330.75
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-2000.52	-211.09	524.05	1310.83	1676.96	1798.82	1924.95	2055.54	2190.74	2330.75
ACUMULATED UNDISTRICTED PROFITS	-2000.62	-2211.71	-1687.65	-376.82	1300.13	3098.95	5023.90	7079.44	9270.19	11600.94
TOTAL INVESTMENT	7882.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	7.80									

A L T E R N A T E - 3

E V A L U A T I O N - 10

We assume:

- All variables as in Evaluation 1.
- Loan interest 4%

Results:

- Rates of return on  
total investment ..... 8,6%
- Pay-back period ..... 3 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
*****										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	3236.48	4375.72	5400.92	6917.14	7572.45	7875.35	8190.36	8517.97	8858.69	9213.04
2. TOTAL RAW MATERIAL COST	-648.37	-885.03	-1143.73	-1426.09	-1576.21	-1655.02	-1737.77	-1824.66	-1915.89	-2011.68
3. OPERATING MARGIN (1+2)	2588.10	3490.69	4457.19	5491.05	5996.24	6220.33	6452.59	6693.32	6942.80	7201.36
4. UTILITIES COST	-259.75	-353.00	-454.20	-563.90	-620.62	-648.94	-678.59	-709.65	-742.16	-776.22
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1040.55	-1092.58	-1147.21	-1204.57	-1264.80	-1328.03	-1394.44	-1464.16	-1537.37	-1614.23
CATEGORY-C	-266.70	-280.03	-294.04	-308.74	-324.18	-340.38	-357.40	-375.27	-394.04	-413.74
CATEGORY-D	-220.50	-231.52	-243.10	-255.26	-268.02	-281.42	-295.49	-310.27	-325.78	-342.07
TOTAL LABOUR COST	-1681.05	-1765.10	-1853.36	-1946.03	-2043.33	-2145.49	-2252.77	-2365.41	-2483.68	-2607.86
6. OVERHEAD COST	-84.05	-88.26	-92.67	-97.30	-102.17	-107.27	-112.64	-118.27	-124.18	-130.39
7. INSURANCE COST	-40.59	-41.81	-43.06	-44.36	-45.69	-47.06	-48.47	-49.92	-51.42	-52.96
8. MAINTENANCE-REPAIR COST	-243.55	-250.86	-258.39	-266.14	-274.12	-282.35	-290.82	-299.54	-308.53	-317.78
9. MARKETING COST	-97.09	-131.27	-168.03	-207.51	-227.17	-236.26	-245.71	-255.54	-265.76	-276.39
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2406.10	-2630.30	-2869.70	-3125.23	-3313.10	-3467.37	-3629.00	-3798.32	-3975.73	-4161.61
11. INDUSTRIAL MARGIN (3+10)	182.01	860.39	1587.49	2365.81	2683.14	2752.96	2823.59	2894.99	2967.07	3039.75
12. DEPRECIATION COST-A (EQUIPMENT)	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10
13. DEPRECIATION COST-B (BUILDINGS)	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	7882.00	7882.00	7882.00	7882.00	7225.50	6542.74	5832.67	5094.20	4326.19	3527.46
15. INTEREST COST	945.84	315.28	315.28	315.28	289.02	261.71	233.31	203.77	173.05	141.10
16. AMORTIZATION FEE				971.78	971.78	971.78	971.78	971.78	971.78	971.78
17. AMORTIZATION OF LOAN				656.50	682.76	710.07	738.47	768.01	798.73	830.68
18. ACUMULATED AMORTIZATION OF LOAN				656.50	1339.26	2049.33	2787.80	3555.81	4354.54	5185.22
19. PRODUCTION COSTS (2+10+12+13-15)	-4680.96	-4511.26	-5009.36	-5547.26	-5858.98	-6064.75	-6280.72	-6507.40	-6745.32	-6995.04
20. GROSS PROFIT (1+19)	-1444.48	-135.54	591.56	1369.88	1713.47	1810.60	1909.64	2010.57	2113.37	2218.00
21. CORPORATE TAX										
22. NET PROFIT	-1444.48	-135.54	591.56	1369.88	1713.47	1810.60	1909.64	2010.57	2113.37	2218.00

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
*****										
INDUSTRIAL MARGIN (11)	182.01	860.39	1587.49	2365.81	2683.14	2752.96	2823.59	2894.99	2967.07	3039.75
INTEREST COST (15)	945.84	315.28	315.28	315.28	289.02	261.71	233.31	203.77	173.05	141.10
AMORTIZATION OF LOAN (17)				656.50	682.76	710.07	738.47	768.01	798.73	830.68
A. WORKING CAPITAL	2212.71	2425.41	2880.88	3370.95	3629.23	3768.82	3914.62	4066.91	4225.98	4392.13
B. CASH FLOW (11-15-17)	-763.83	545.11	1272.21	1394.03	1711.36	1781.18	1851.82	1923.21	1995.29	2067.97
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW*DISCOUNT FACTOR (B * C)	-741.59	513.82	1164.25	1238.58	1476.24	1491.71	1505.70	1518.20	1529.22	1538.76
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-741.59	-227.77	936.48	2175.07	3651.30	5143.01	6648.71	8166.91	9696.13	11234.89
F. PAY OUT TIME	3.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	3236.48	4375.72	5600.92	6917.14	7572.45	7875.35	8190.36	8517.97	8858.69	9213.04
PRODUCTION COSTS (19)	-4680.96	-4511.26	-5009.36	-5547.26	-5858.98	-6064.75	-6280.72	-6507.40	-6745.32	-6995.04
GROSS PROFIT (20)	-1444.48	-135.54	591.56	1369.88	1713.47	1810.60	1909.64	2010.57	2113.37	2218.00
CORPORATE TAX (21)										
NET PROFIT (22)	-1444.48	-135.54	591.56	1369.88	1713.47	1810.60	1909.64	2010.57	2113.37	2218.00
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-1444.48	-135.54	591.56	1369.88	1713.47	1810.60	1909.64	2010.57	2113.37	2218.00
ACUMULATED UNDISTRICTED PROFITS	-1444.48	-1580.02	-988.46	381.42	2094.89	3905.49	5815.13	7825.70	9939.07	12157.07
TOTAL INVESTMENT	7882.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	8.60									

ALTERNATE - 3

EVALUATION - 11

We assume:

- All variables as in Evaluation 1.
- Loan interest 10%

Results:

- Rates of return on  
total investment ..... 2%
- Pay-back period ..... 5 years

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
-----										
<b>PRODUCTION COSTS AND</b>										
<b>NET INCOME STATEMENT</b>										
<b>IN THOUSAND DOLLARS</b>										
*****										
1. TOTAL SALES	3236.48	4375.72	5600.92	6917.14	7572.45	7875.35	8190.36	8517.97	8858.69	9213.04
2. TOTAL RAW MATERIAL COST	-648.37	-885.03	-1143.73	-1426.09	-1576.21	-1655.02	-1737.77	-1824.66	-1915.89	-2011.68
3. OPERATING MARGIN (1+2)	2588.10	3490.69	4457.19	5491.05	5996.24	6220.33	6452.59	6693.32	6942.80	7201.36
4. UTILITIES COST	-259.75	-353.00	-454.20	-563.90	-620.62	-648.94	-678.59	-709.65	-742.16	-776.22
5. LABOUR COST										
CATEGORY-A	-153.30	-160.96	-169.01	-177.46	-186.34	-195.65	-205.44	-215.71	-226.49	-237.82
CATEGORY-B	-1040.55	-1092.58	-1147.21	-1204.57	-1264.80	-1328.03	-1394.44	-1464.16	-1537.37	-1614.23
CATEGORY-C	-266.70	-280.03	-294.04	-308.74	-324.18	-340.38	-357.40	-375.27	-394.04	-413.74
CATEGORY-D	-220.50	-231.52	-243.10	-255.26	-268.02	-281.42	-295.49	-310.27	-325.78	-342.07
TOTAL LABOUR COST	-1681.05	-1765.10	-1853.36	-1946.03	-2043.33	-2145.49	-2252.77	-2365.41	-2483.68	-2607.86
6. OVERHEAD COST	-84.05	-88.26	-92.67	-97.30	-102.17	-107.27	-112.64	-118.27	-124.18	-130.39
7. INSURANCE COST	-40.59	-41.81	-43.06	-44.36	-45.69	-47.06	-48.47	-49.92	-51.42	-52.96
8. MAINTENANCE-REPAIR COST	-243.55	-250.86	-258.39	-266.14	-274.12	-282.35	-290.82	-299.54	-308.53	-317.78
9. MARKETING COST	-97.09	-131.27	-168.03	-207.51	-227.17	-236.26	-245.71	-255.54	-265.76	-276.39
10. INDUSTRIAL COST (4+5+6+7+8+9)	-2406.10	-2630.30	-2869.70	-3125.23	-3313.10	-3467.37	-3629.00	-3798.32	-3975.73	-4161.61
11. INDUSTRIAL MARGIN (3+10)	182.01	860.39	1587.49	2365.81	2683.14	2752.96	2823.59	2894.99	2967.07	3039.75
12. DEPRECIATION COST-A (EQUIPMENT)	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10	-573.10
13. DEPRECIATION COST-B (BUILDINGS)	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55	-107.55
<b>BANK LOANS</b>										
14. OUTSTANDING BALANCE OF LOAN	7882.00	7882.00	7882.00	7882.00	7387.44	6843.43	6245.01	5586.75	4862.67	4066.17
15. INTEREST COST	2364.60	788.20	788.20	788.20	738.74	684.34	624.50	558.68	486.27	406.62
16. AMORTIZATION FEE				1282.76	1282.76	1282.76	1282.76	1282.76	1282.76	1282.76
17. AMORTIZATION OF LOAN				494.56	544.02	598.42	658.26	724.08	796.49	876.14
18. ACUMULATED AMORTIZATION OF LOAN				494.56	1038.57	1636.99	2295.25	3019.33	3815.83	4691.97
19. PRODUCTION COSTS (2+10+12+13-15)	-6099.72	-4984.18	-5482.28	-6020.18	-6308.70	-6487.38	-6671.92	-6862.31	-7058.54	-7260.56
20. GROSS PROFIT (1+19)	-2863.24	-608.46	118.64	896.96	1263.75	1387.96	1518.44	1655.67	1800.15	1952.48
21. CORPORATE TAX										
22. NET PROFIT	-2863.24	-608.46	118.64	896.96	1263.75	1387.96	1518.44	1655.67	1800.15	1952.48

	1	2	3	4	5	6	7	8	9	10
<b>FOSTER WHEELER IBERIA</b>										
<b>CASH FLOW TABLES</b>										
*****										
INDUSTRIAL MARGIN (11)	182.01	860.39	1587.49	2365.81	2683.14	2752.96	2823.59	2894.99	2967.07	3039.75
INTEREST COST (15)	2364.60	788.20	788.20	788.20	738.74	684.34	624.50	558.68	486.27	406.62
AMORTIZATION OF LOAN (17)				494.56	544.02	598.42	658.26	724.08	796.49	876.14
A. WORKING CAPITAL	2685.63	2583.05	3038.52	3528.59	3779.13	3909.70	4045.02	4185.21	4330.38	4480.64
B. CASH FLOW (11-15-17)	-2182.59	72.19	799.29	1083.05	1400.38	1470.20	1540.84	1612.23	1684.31	1756.99
C. DISCOUNT FACTOR AT DEVALUATION RATE	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74
D. CASH FLOW DISCOUNT FACTOR (B * C)	-2119.02	68.05	731.46	962.28	1207.98	1231.27	1252.84	1272.71	1290.88	1307.36
E. ACUMULATED CASH FLOW AT DEVALUATION RATE	-2119.02	-2050.98	-1319.51	-357.23	850.75	2082.02	3334.86	4607.57	5898.45	7205.81
F. PAY OUT TIME	5.00									
<b>NET INCOME STATEMENT</b>										
TOTAL SALES (1)	3236.48	4375.72	5600.92	6917.14	7572.45	7875.35	8190.36	8517.97	8850.49	9213.04
PRODUCTION COSTS (19)	-4099.72	-4984.18	-5482.28	-6020.18	-6308.70	-6487.38	-6671.92	-6862.31	-7058.54	-7260.56
GROSS PROFIT (20)	-2863.24	-608.46	118.64	896.96	1263.75	1387.96	1518.44	1655.67	1800.15	1952.48
CORPORATE TAX (21)										
NET PROFIT (22)	-2863.24	-608.46	118.64	896.96	1263.75	1387.96	1518.44	1655.67	1800.15	1952.48
DIVIDENDS ON EQUITY										
UNDISTRIBUTED PROFITS	-2863.24	-608.46	118.64	896.96	1263.75	1387.96	1518.44	1655.67	1800.15	1952.48
ACUMULATED UNDISTRICTED PROFITS	-2863.24	-3471.70	-3353.06	-2456.10	-1192.35	195.61	1714.05	3369.72	5169.87	7122.35
TOTAL INVESTMENT	7882.00									
<b>RATIOS</b>										
RATE OF RETURN ON TOTAL INVESTMENT	2.00									

EXHIBIT III-2

FINANCIAL SOURCES



## FINANCIAL SOURCES

The following official banking institutions could be approached to obtain loans for the project implementation:

- AFRICAN DEVELOPMENT BANK
- ASIAN DEVELOPMENT BANK
- INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT (WORLD BANK)
- THE OPEC FUND FOR INTERNATIONAL DEVELOPMENT
- ARAB FUND FOR ECONOMIC AND SOCIAL DEVELOPMENT
- ARAB INTERNATIONAL BANK
- KUWAIT FUND FOR ARAB ECONOMIC DEVELOPMENT
- ISLAMIC DEVELOPMENT BANK
- SAUDI FUND FOR DEVELOPMENT
- ABU DHABI FUND FOR ARAB ECONOMIC DEVELOPMENT
- ISLAMIC INTERNATIONAL BANK FOR INVESTMENT AND DEVELOPMENT
- FOUNDATIONS
- GOVERNMENTS
- CENTRAL AMERICAN BANK FOR ECONOMIC INTEGRATION

Other sources can be found in UNIDO Publication PI/61/Rev.2, "Financial Resources For Industrial Projects In Developing Countries".

