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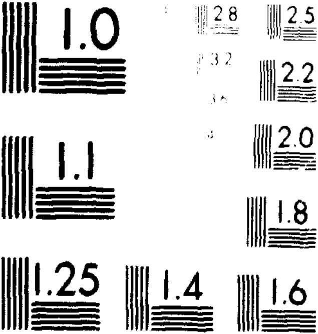

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UNITED NATIONS

INDUSTRIAL DEVELOPMENT ORGANIZATION

DRAFT FINAL REPORT

FEASIBILITY STUDY.

Mongolia. ESTABLISHMENT OF A PILOT PLANT FOR PROCESSING OF BIOCHEMICAL PRODUCTS.

MONGOLIA

PROJECT NO: DP/MON/80/004

POLYTECHNA SPOFA

PRAGUE - CZECHOSLOVAKIA

DECEMBER 1981

THE FEASIBILITY STUDY - CONTENTS

CHAPTER I. EXECUTIVE SUMMARY

CONTENTS :

PROJECT BACKGROUND AND HISTORY
/CHAPTER II/

The long-term conception of the United Nations Organization of the programme of aid to developing countries also included a project of improvement and expansion of pharmaceutical industry in Mongolia.

This industrial branch in Mongolia is presently in the development stage, and only a limited assortment of pharmaceutical products and dispensing forms of domestic provenance is available. The Mongolian Government is well aware of the necessity to build up the pharmaceutical industry for the needs both of the human and the veterinary medicial care.

The experts of both interested parts had recommended to aim the development conception at the exploitation of Mongolia's very good and rich basis of natural raw materials. Mongolia has a relatively large animal production, with large amounts of slaughterhouse offal, which is a cheap, but valuable raw material for certain sorts of biochemical pharmaceutical industrial products.

The very processing of the slaughterhouse offal to pharmaceuticals, substances or final dispensing forms, is the main idea and target of the present project.

In Mongolia three centres exist at present where slaughterhouse offal is produced. The largest and most modern one is located in the capital city, Ulan Bator, and

In this way, the Mongolian Government plans to build biochemical integrated works. A part of this planned complex is the proposed pilot plant for biochemical manufacture, which is the subject of the present study.

Its production programme will include peptone, pepsin, trypsin, chymotrypsin, pancypsin, cholesterol, pancreatin, blood hydrolysate, dried bile, and manufacture of tablets and sterile substances.

The production capacities are projected for a pilot--plant scale.

The products specified above will primarily augment the assortment of pharmaceuticals available on the Mongolian market. Some of the substances will also represent valuable export commodities.

In Mongolia the biochemical integrated works is subordinated to the Ministry of Lights and Food Industries.

The aim of the present feasibility study is to estimate the technical and economical feasibility of the intended buildup of a branch of pharmaceutical industry based on exploitation of slaughterhouse offal.

The United Nations Industrial Development Organization /UNIDO/ in Vienna, Austria, had commissioned Czechoslovak experts with the elaboration of the present study. The experts are represented by the Foreign Trade Organization Polytechna, Prague Czechoslovakia. The specialists in the biochemical production branch had been selected with a view to a complex elaboration of the study, with due regard to the technical, economical and technological complexity of the problem to be solved.

All of them have been active for many years as specialists at the United Pharmaceutical Works in Prague, Czechoslovakia /SPOFA/. The experts' field-work team consisted of specialists active in the research and quality control of biochemical engineering and building specializations. Additional assisting workers active in specialized branches collaborated in assembling the present final report in Czechoslovakia. They were mainly experts in planning, economics, steering and automation, electrical engineering, electronics, work hygiene, and work safety.

Before the departure for Mongolia the working team selected the reference data and offers from stable suppliers of equipment for the chemical-pharmaceutical industry. Data for comparison were collected from manufacturing plants and facilities of analogous characters, already realized.

During the field-work, urbanistic exploration was made with regard to the planimetric and altimetric features, geographic and demographic conditions, and potential connection with the electricity and water supply mains, sewage network, and traffic systems. Explorations were made of the marketing and sale conditions, the actual level of technology, the price and foreign exchange regulations. The qualifications were checked of labourers, technologists, engineering workers, and managers. The supply situation and prices of raw materials and energies, and the wages policy were ascertained. The annual number and volume of working days were calculated, and potential shift work was estimated.

Consultations with workers of the United Nations Development Programme /UNDP/ and United Nations Industrial Development Organization /UNIDO/, as well as with state authorities in Mongolia, represented an important component of the field-work.

After the experts' return from Mongolia the export possibilities and the prices of machinery and technological equipment were re-checked.

The reality of the study depends not only on the preliminary exploratory work, but also on a proper elaboration. As a guideline for its contents the MANUAL FOR THE PREPARATION OF INDUSTRIAL FEASIBILITY STUDIES /1978/ had been accepted.

The present feasibility study not only has been aimed at documenting that the fundamental idea was realizable; moreover, from the technical aspect the entire project follows the endeavour at a maximal universal versatility of the proposed premises and equipment, to enable the Mongolian party to realize pilot-plant-scale production of additional pharmaceutical products, recommended by the experts in the subsequent chapters.

MARKET AND PLANT CAPACITY
/CHAPTER III/

MARKETING STUDY

In estimations of the total requirements for the planned biochemicals and pharmaceuticals it has to be taken into account first of all that Mongolia is a country with a small population and therefore the domestic consumption of most of the planned products will represent only a smaller part of the total production volume. Consequently, for all products their potential export has to be considered, which, in addition, would considerably contribute to the national economy.

Therefore, already in the projects of the initial production capacities and of the production programme structure also the present potential sales of the final products had been taken into consideration. The demands of the world market have been estimated on the basis of recent data obtained from the foreign trade organization, and the domestic requirements for the health care and industrial needs in Mongolia, on the basis of information obtained from the Mongolian side during the group of experts' stay. In Mongolia the chemical, pharmaceutical, and consumers' goods industries, as well as the health care services, are still in the development stages, and therefore the estimations are rather rough; neverthless, the domestic demands can be expected to show rather rising tendencies.

According to the production possibilities and technologies now handy in Mongolia the initial production programme for the proposed pilot plant has been established

Production of peptone	32.000	kg
Production of pepsin, pharmaceutical	100	kg
Production of pepsin,for food industry	1.000	kg
Production of chymotrypsin	20	kg
Production of trypsin	12	kg
Production of pancypsin	87,5	kg
Production of cholesterol	700	kg
Production of pancreatin	3.000	kg
Production of blood hydrolysate	1.860	kg
Production of dried bile	3.900	kg

This chemical production is then connected with the pharmaceutical department, where the production of pharmaceuticals in their final form is performed. This department ensures the manufacture of tablets and coated tablets and the manufacture of injections.

The production programme of the biochemical department should be taken as an initial one, and for the future development of the whole pilot plant it was proposed to extend the programme for production of serum gonadotropin, insulin and heparin. All of these products are in strong demand on the world markets, steadily exceeding the supply, and this situation can be also expected in the near future.

The technology of serum gonadotropin is presently in the stage of laboratory research in Mongolia.

Technological procedures of heparin and insulin production have not been studied in Mongolia so far. The experts recommended to the Mongolian side, in view of the importance of both products, to acquire the production know-how from abroad.

SALES FORECAST

The main products of the pilot plant will be substances. The manufacture of tablets and injections will receive additional substances supplied by the existing pharmaceutical works in Mongolia.

It is expected that the main buyer of exported goods will be the Union of Soviet Socialist Republics; the Hungarian People's Republic, Korean People's Republic, German Democratic Republic, Denmark, and Japan are expected to come next. Some products may also find interest in other countries. Obviously, the export volume is dependent on the quality of the products.

MATERIALS AND INPUTS
/CHAPTER IV/

IV. Specifications for raw and auxiliary materials

In the pilot-plant operations, both domestic raw materials and other materials - imported from abroad, will be processed.

Raw materials supply planning

A. Domestic raw materials consist in slaughterhouse offal. In Mongolia the livestock is slaughtered in the course of half a year. The slaughterhouse plants are equipped with efficient cool stores, from which the raw materials for the pilot-plant processing can be successively drawn.

The pilot-plant stores are calculated for storage of 400 tons of raw materials, ensuring sufficient reserves for bridging over the period when the slaughterhouse plants are not working. The storage temperature is -20 to -[illegible] °C.

B. Imported raw and auxiliary materials

In view of ireegular deliveries of imported chemicals the supply planning must ensure reserves for minimally 4 months. The storerooms for such materials, destined both for chemical and pharmaceutical production, are dimensioned accordingly.

Besides the basic raw materials specified before, the production programme requires certain chemicals not produced in Mongolian Peoples Republic.

LOCATION AND SITE
/CHAPTER V/

LOCATION

The all-state territorial conditions in Mongolia for the selection of a locality suitable for the development of biochemical production for the pharmaceutical industry issue from an exploration of the whole territory. In Mongolia three slaughterhouse plants are operating at present. The largest of them is located in the capital city Ulan Bator. Therefore the decision was made, in the all-national interest as well as in accordance with the plant operation economy, to build up an integrated biochemical works in this locality.

The projected biochemical pilot plant will be a part of the planned biochemical integrated plant in Ulan Bator. Upon the expert team's recommendation a site in the west part of the city was selected. According to the master extension plan the territory concerned lies within a future industrial zone.

The selected building site is plane, its subsoil consists of compact gravel sand. In the western direction it neighbours on a new heating plant N^{o} 4 under construction. On the nothern side connections with the city communication, steam pipeline, and electricity main are possible. The southern part of the lot offers connections with a railroad siding and with the city water main. The eastern side is reserved for extension of other industrial plants.

PROJECT ENGINEERING

/CHAPTER VI/

The pilot plant for the future biochemical integrated works is designed with a view to comply with the requirements of the whole production plan, with respect to the technological processes proposed and the local conditions. This means that the whole complex of aspects necessary for the correct running of the proposed plant has been taken into account in the layout plan. It is presumed that the pilot plant will be realized in advance.

The machinery and technological equipment proper is of a fairly universal character and expedient for the proposed production programme. The planned pilot plant in fact is a link between the research and the production. This idea is also inherent in the prospective master plan, whose draft outline is documented in the present report, too, although its elaboration had not been imposed to the expert group.

The layout plan of the pilot plant is actually governed by the characters of its parts, namely,

- biochemical production
- pharmaceutical manufacture
- quality control laboratories.

The main technological premise B-109 - Biochemical pilot plant is a three-floor building with the ground dimensions 55m x 16m. This building is designed for biochemical production and is complemented with the store rooms, cooled stores, cooling boxes and other auciliary units.

The premise B-110 Pharmaceutical pilot plant, with the ground dimensions 43m x 13m, is a two-floor building. At the ±0 level there are localized the storerooms for packaging material, glassware, chemicals, intermediate products, and final products.

The B-111 Laboratory part is a multipurpose three-floor building with the ground dimensions 43m x 16m. This building contains not only the quality control laboratories but also offices, study rooms, library and central social premises.

The engineering and technological part is divided into the following premises:

A - 01 Production of peptone

A - 02 Production of pepsin

A - 03 Production of trypsin
chymotrypsin
pancypsin

A - 04 Production of cholesterol

A - 05 Production of pancreatin

A - 06 Production of blood hydrolysate

A - 07 Production of dried bile

A - 08 Manufacture of tablets

A - 09 Manufacture of sterile substances

A - 10 Quality Control Laboratory

A - 11 Solvent recovery plant

A - 12 Water demineralization plant

A - 13 Engine room for steam, condensate, and hot water production

A - 14 Neutralization plant

A - 15 Store for inflammable solvents

A - 16 Central pressure air production

A - 17 Cooling plant

A - 18 Transformer station 35/0.4 kV

A - 19 Air conditioning station

A - 20 Maintenance shops

A - 21 In-process transportation

Building part

B - 101 Preparation of the land for buildings

B - 102 Outside connections of electricity 35/0.4 kV

B - 103 Outside connections of water supply

B - 104 Outside connections of low tension electricity

B - 105 Outside connections of steam /pipe lines/

B - 106 Outside connections to city sewerage

B - 107 Roadways

B - 108 Store for liquid material

B - 109 Biochemical pilot plant

B - 110 Pharmaceutical pilot plant

B - 111 Quality control and social premises.

PLANT ORGANIZATION AND OVERHEAD COSTS
/CHAPTER VII/

From the organizational aspect of the new biochemical integrated works, the projected pilot plant for biochemical production for pharmaceutical purposes will operate as an integral cost centre.

This decision is based on the fact, that the pilot plant includes facilities for pilot-plant-scale operations, requiring a complete cooperation and coordination among the individual departments.

Evidently, the pilot plant operates as an integral dispositional whole, and the raw material input and finished product output will be assessed in a uniform way. The transfer of documentation from the pilot plant for full-scale production will be made in the form of a separate master file for each final product.

The production plan, although specified in the pertinent chapter inclusive of the capacities, may be considerably variable. The disposition must allow a fat variation of the programme with regard to the actual results of the research.

Despite the great complexity of all operations, the extent of the pilot plant proper is adequate to its pre--production mission, and therefore the pilot plant is provided to constitute an integral cost centre.

The authors of the present chapter have decided, having taken into consideration the propositions, to combine the factory and administrative overheads and not to respect them separately.

The structure of the socialist society, also reflected in the industrial enterprises in Mongolia, presumes that the overhead costs include the following items:

- property taxes
- depreciation:

  buildings /2.6% per year/
  machinery /13% per year/
  office equipment /3.5% per year/
- communication
- off-site transport
- maintenance

Administrative costs, costs of building management, labourers' wages and social security contributions are included in the pertinent chapters and not included in Chapter VII.

It is pointed out that the insurance fees /social security contributions/ and the income taxes both employees and labourers are already included in their basic salaries and hour wages /see Chapter VIII/.

Consequently, the authors of the present report will adhere to the recommended calculation alternative 1, and consider solely the remaining overhead costs, as specified in Schedule 7-1.

MANPOWER
/CHAPTER VIII/

LABOURERS

The manning plan was elaborated with regard to the proposed production programme, the production capacities, and also to the local conditions.

Labourers have to be provided for the following sectors:

- biochemical production
- pharmaceutical production
- warehouse handling
- energy supply operation
- auxiliary facilities
- maintenance work
- clean-up services
- watching services

The selection of the labourer categories was consulted with the Mongolian side with the following results:

labourer category 6B - qualified labourer with apprenticeship certificate

- experienced labourer - foreman or deputy foreman

5B - labourer with apprenticeship certificate in the branch of

- biochemical production
- pharmaceutical production
- maintenance
  - electricians
  - locksmiths
  - joiners
- energy supply operators

4B - labourers for assembling and storage handling

3B - charwomen, female packaging workers, forwarding department hands, gatekeepers.

Technicals and administration

The manpower plan of these categories is based on the given economic and production structure, reflected in the organizatory regulations of the pilot plant; the following posts are provided:

- director of the pilot plant
- vice director - economics
  - production
  - research
- head, biochemical department
- head, pharmaceutical department
- head, quality control unit
- chief technologist
- chief engineer
- workers in accounting department
- workers in planning department
- workers in supply department
- workers in personnel department
- secretaries
- workers in staff education department
- librarian
- heads of analytical laboratories
- chief physicist
- chief biochemist
- chief analyst
- laboratory technicians

In the category of technical and clerical workers, collaboration of foreign specialists is planned in the initial operation period /see Schedule 8-3/ and, on the other hand, in training of Mongolian workers in selected foreign countries with advanced biological production.

For the purposes of Mongolian workers' training, shorter or longer visits to foreign countries are envisaged.

Shorter visits /2-4 weeks/ are intended to improve the training in the spheres of

- biochemical production processes
- biochemical production planning
- production management
- good manufacturing practice

Longer visits are envisaged for

- 3 biochemists
- 3 quality control specialists
- 2 pharmacists

Training directly at the pilot plant in Mongolia will be organized and supervised by the following persons:

- chief engineer of construction
- specialist in biochemical production
- expert in quality control
- specialist in pharmaceutical production
- bacteriologist.

IMPLEMENTATION SCHEDULING

/CHAPTER IX/

Essential data and activities

The planned pilot plant is financed partially by the Mongolian Government and partially by the UNIDO, Regional Office Vienna. Both partners had agreed that the project would be realized in the period 1982 - 1986. The Mongolian Government will ensure the realization conditions in the full extent.

The obligations ensuring the realization are divided between both sides as mentioned in Chapter IX.

Selection of realization plan and working schedule

The realization plan, in connection with the working schedule, must have the following consecution:

- hydrogeological prospecting
- altimetric and planimetric survey
- building plan
- preparation of building site

The construction work proper will start with the construction of water piping, gas piping, steam piping, electricity cable lines, canalization, and roadway connection. The realization of this work is planned for 1983 /B-102 to B-107/.

The buildings are designed so that analogous construction technology will serve for all three of them. Underground work is excluded. Completely assembled structures are envisaged. The heights of the individual floors and the total height of the highest building allow a maximal use of construction mechanization.

The character of the machinery equipment, its presumptive dimensions, and the interconnection of the individual technological units allow successive assembling.

The assembling of machinery equipment must start in B-10[illegible], where the volume of equipment and assembling work is largest.

Key and decisive terms of pilot-plant construction

- start of pilot-plant construction B-101, B-102, B-103, B-104, B-105, B-106, B-107, B-109	May 1983
- start of construction B-110 and B-111	October 1983
- making B-109 ready for machinery equipment assembling	June 1984
- making B-110 ready for machinery equipment assembling	January 1985
- start of construction B-108	June 1985
- making B-111 ready for machinery equipment assembling	June 1985
- trial operation	June 1986
- full operation	December 1986

Estimation of project realization costs

In the case of the operations carried out in the course of the investment phase up to the moment of the start of full production operation, the costs have to be estimated of the following items:

- projecting work
- authors' supervisory activity
- inspection activity
- administration of building and construction management
- fees for approval procedures
- training of staff and labourers

The financial means for covering the costs of

- the building site
- technological equipment
- building and construction work
- machinery and equipment
- materials
- raw material
- overhead costs

are specified in pertinent foregoing chapters.

FINANCIAL AND ECONOMIC EVALUATION

/CHAPTER X/

Project financing

The project is financed by the UNIDO and the Mongolian Government. The financial means have not the character of loans and are not-repayable.

Project costs

The total investment cost, 18,451.900, include the fixed investment costs and the reproduction capital expenditure. The working capital is provided annually by the Mongolian Government.

	Foreign currency	Local currency	Total
A. Fixed investment costs			
Site preparation		809.000,-	809.000,-
Buildings		9,729.000,-	9,729.000,-
Machinery	3,393.540,-	600.000,-	3,993.540,-
Total			14,531.540,-
B. Preproduction capital expenditure			3,920.360,-
Total A + B			18,451.900,-
C. Working capital			3,389.475,-

Financial means:

Source	Fixed investment costs	Reproduction capital expenditure	Total
Total investment costs	14,531.540,-	3,920.360,-	18,451.900,-

These means will be drawn in the course of the construction period as follows:

Expences are published in Mongolian currency /Tg/

YEAR	MONGOLIAN GOVERNMENT	UNIDO	TOTAL	%
1982	494.000,-	359.300,-	853.300,-	4,62
1983	3,106.000,-	458.000,-	3,564.000,-	19,32
1984	3,115.000,-	776.000,-	3,891.000,-	21,09
1985	3,770.000,-	1,690.000,-	5,460.000,-	29,59
1986	2,640,000,-	2,043.600,-	4,683.600,-	25,38
Total	13,125.000,-	5,326.900,-	18,451.900,-	100,00

With due regard to the character of the present project, formulated in Chapter II of this study, the Chapter X is elaborated in accordance with the guidelines set in the Manual for the Preparation of Industrial Feasibility Studies, UNIDO publication No.E.II.B.5 of 1978.

The essential date given below lead to the following conclusions:

1/ The annual rate of profit from the equity capital grows from 13.12% in rhw diear year of production to 28.70% in the year of expected 100% production capacity:

Construction		Start-up and full production				
Year	1 2 3 4 5	6	7	8	9	10	11
Net profit after tax		2421272	3837096	5004411	5295121	5295121	5295121
Equity capital		18451900	18451900	18451900	18451900	18451900	18451900
Rate of profit%		13,12	20,80	27,12	28,70	28,70	28,70

2/ The initial investment costs, ie, 18,451.900,- Tg, will be paid back within less than 9 years from the start of construction / calculation of rate of return of the project/:

Year	Net profit	Depreciation	Amount paid back	Balance
1	---	---	---	18,451.900,-
2	---	---	---	- " -
3	---	---	---	- " -
4	---	---	---	- " -
5	---	---	---	- " -
6	2,421.272,-	698.200,-	3,119.472,-	15,332.428,-
7	3,837.096,-	698.200,-	4,535.296,-	10,797.132,-
8	5,004.411,-	698.200,-	5,702.611,-	5,094.521,-
9	5,295.121,-	698.200,-	5,993.321,-	---
10	5,295.121,-	698.200,-	5,993.321,-	---

3/ The simple rate of profit in the 9th year after the start of construction /production with 100% capacity/ will be:

$$R_e = \frac{\text{net profit}}{\text{equity capital}} \times 100 = \frac{5,255.121}{18,451.900} \times 100 = 28,70\%$$

4/ The rate of return of the project in the 9th year after the start of construction will be:

$$\frac{\text{net profit}}{\text{total investment outlay}} \times 100 = \frac{5,295.121}{10,626.517} \times 100 = 49.83\%$$

Conclusions

As it has been already mentioned, the proposed pilot plant is projected as a base for the future development of the pharmaceutical industry in Mongolia and it will enable to the country not only the production of basic biochemical products but also the extension of sortiment of basic pharmaceuticals necessary for Mongolian Health Care. Important role will also play the fact that this production will fully utilize the waste products from slaughterhouses and so bring their good revaluation.

The planned widening of the biochemical production programme by the future production of principal and very important drugs like insulin, heparin and gonadotropins will bri an additional economical contribution for the country's ec. .ay, because these biochemical pharmaceuticals play an important role in medical care all over the world.

CHAPTER II. PROJECT BACKGROUND AND HISTORY

CONTENTS:

PROJECT BACKGROUND

The promoter of the feasibility study is the United Nations Industrial Development Organization, P.O. BOX 300, A - 1400 Vienna, Austria.

The feasibility study was elaborated by a team of Czechoslovak experts - employees of SPOFA United Pharmaceutical Works, National Corporation, Prague, Czechoslovakia /Mr.V.Vávra, team leader, Mr.Z. Bárta, Grad. Eng. J. Frýda, Mr. F. Kroutil/. All of them have been active for many years in the branches of biochemistry and pharmaceutical industry, with minimally 25 years of practice each. They are represented by Polytechna, Foreign Trade Organization, Prague, Czechoslovakia.

PROJECT PROMOTER
AND/OR INITIATOR

The project initiator is the Government of the Mongolian People's Republic /Mongolian Government/, which gives top priority to the present project. Accordingly, the Mongolian Government had applied to the UNDP/UNIDO for technical aid as well as for financial subsidy for the development of biochemical and pharmaceutical industry.

In the general information of UNDP/UNIDO of 3 February, 1980, the financial contribution of the Mongolian Government was limited to the sum of 60 million Tughasak. The financial contribution granted by the UNDP/UNIDO was set to 1 760 000 dollars. This sum may be spent exclusively for machinery and technological equipment, spare parts, and personnel training.

The financial quota granted by the UNDP/UNIDO is included in the UN long-term plan for Mongolia and must not be exceeded. Furthermore, it is presumed that 65% of the sum is destined for equipment, and 35%, for personnel training.

PROJECT HISTORY

The development of the project is presently in the stage of a feasibility study, which is being elaborated on the basis of

- the Preparatory assistance document UNIDO of 20 January, 1980
- the General information UNIDO of 3 February, 1980

On the basis of general preparatory work and in parallel with the prospecting and surveying work carried out in Mongolia, the team of experts succeeded in designing preliminary schemes of premises and preliminary flow-sheets of production processes already in the field-work stage. The preliminary documentation included fundamental production schemes, data on capacities, a list of machinery and equipment, requirements for raw materials, power and water supplies, manpower, data on the extent of building work and costs.

In Mongolia the initial documentation was discussed with the representatives of

- the UNDP Agency in Ulan Bator:
  Mr. Aborkin, UNDP Resident Representative in Ulan Bator
  Mr. Linamyaa, UNDP officer in Ulan Bator
  Mr. Polievtkov, officer of the UNIDO Technical Section, Vienna

- the Mongolian side:
  Mr. Sumya, Vice-Minister of light and Food Industry in Ulan Bator

Mr. Pod, Vice-President of Government Commission on Economic Relations in Ulan Bator

Mr. Tseremdendev, Director, Research Centre for Enzymology and Microbiology in Ulan Bator

Mr. Yambamba, Chief Architect of the City of Ulan Bator.

The results of the consultations were reconsidered in the final phase, and adequate suggestions have been taken into account in the present study.

FEASIBILITY STUDY

The aim of the present feasibility study is to assess the economical and technical feasibility of building up in Mongolia pharmaceutical industrial works, based on exploitation of slaughterhouse offal as the principal domestic raw material.

It is assumed that to Ulan Bator, where the sources of slaughterhouse offal are largest, these materials will be also transported from the slaughterhouses in Darchan and Choibalsan for the needs of the future biochemical integrated works.

The present yearly production of slaughterhouse offal:

1.	Cattle's pancreas	122	tons
2.	Cattle's bile /choler/	68	tons
3.	Cattle's trachea	65	tons
4.	Cattle's paunch	950	tons
5.	Cattle's stomach /ventricle/	430	tons
6.	Cattle's eyes	10.2	tons
7.	Mucous membrane of Cattle's abomasum	166	tons
8.	Cattle's blood	3 800	tons
9.	Cattle's spinal cord	177	tons
10.	Cattle's hoofs	263	tons
11.	Cattle's horns	530	tons

In view of the present technological level of the biochemical and biopharmaceutical production in Mongolia it is presumed that the whole investment will be realized as a pilot plant. Local inquiry showed that the raw material volumes are adequate to the intended project. The Mongolian side possesses certain fundamental technological knowledge of biochemical production. It also has at disposal technological personnel with university grade education. This personnel, after adequate special training, will be capable to manage and develop the biochemical production.

The production programme and capacities of the pilot plant are limited, firstly, by the financial support granted by the UNDP/UNIDO for the machinery, technological equipment, personel training, and spare parts; and secondly, by the Mongolian side's qualification for industrial production of biochemical pharmaceuticals.

Time schedule of building and construction costs

Granted by	1982	1983	1984	1985	1986	Total
UNDP/UNIDO US $	106 000	135 000	229 000	500 000	604 600	1576 000
Granted by Mongolia TG	494 000	3,106 000	3,115 000	3,770 000	2,640 000	13,125 000

The feasibility study pays due regard to

a/ the society and economic benefit

b/ the technical versatility of the pilot-plant premises and equipment

a/ In Mongolia the pharmaceutical industry and its development are coordinated by the Ministry of Light and Food Industry.

This branch is responsible for the development of pharmaceutical production, inclusive of final products /dispensing forms/ for the domestic health care. Export of certain pharmaceuticals contributes to the assets of the national economy.

The experts suggest the following production programme for the pilot plant:

Production of peptone
pepsin
trypsin
chymotrypsin
pancypsin
cholesterol
pancreatin
blood hydrolysate
dried bile
Manufacture of tablets
sterile substances.

The localization of the bilot plant for biochemical products in the future biochemical integrated works is disposed conceptionally between the research and production. The biochemical integrated works is included into industrial zone in the western sector of the City of Ulan Bator. The distance from the raw-material source is about 1 500 m via city roadway. The immediate connections with the roadways, railway, power and water lines, sewage system, etc. are shown in the Fig. II. A schematic map of Mongolia shows the localization of Ulan Bator /Fig. I./.

b/ Technical versatility of premises and equipment

The building-technological conception of the project is based on the presumption that the pilot plant for biochemical production will be realized as a separate part of the whole biochemical integrated works. Consequently, from the aspect of external interrelations the pilot plant buildings are designed so as to be self-contained in all respects;

- raw material storage
- production facilities
- energy supplies
- water supply
- manpower
- quality control
- maintenance
- administrative apparatus
- stores management.

The conceptional design of the buildings, premises, and equipment also takes in consideration potential changes in the production programme, motivated by future research work results.

ESTIMATE OF INVESTMENT COST

PRE-INVESTMENT STUDIES AND PREPARATORY INVESTIGATIONS

			ITEM DESCRIPTION			UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
1.			FEASIBILITY STUDY (PRE-INVESTMENT STUDY)				39868		134750
2.			HYDROGEOLOGICAL PROSPECTING					150000	150000
3.			LAND SURVEY, PLANI- AND ALTIMETRIC					20000	20000
			TOTAL				39868	170000	304750

(INSERT TOTAL IN SCHEDULE 10-2/1)

CHAPTER III. MARKET AND PLANT CAPACITY

CONTENTS:

DEMAND AND MARKET STUDY

MARKETING STUDY

In estimations of the total requirements for the planned biochemicals and pharmaceuticals it has to be taken into account first of all that Mongolia is a country with a small population and therefore the domestic consumption of most of the planned products will represent only a smaller part of the total production volume. Consequently, for all products their potential export has to be considered, which, in addition, would considerably contribute to the national economy.

Therefore, already in the projects of the initial production capacities and of the production programme structure also the present potential sales of the final products had been taken into consideration. The demands of the world market have been estimated on the basis of recent data obtained from the foreign trade organization, and the domestic requirements for the health care and industrial needs in Mongolia, on the basis of information obtained from the Mongolian side during the group of experts' stay. In Mongolia the chemical, pharmaceutical, and consumers' goods industries, as well as the health care services, are still in the development stages, and therefore the estimations are rather rough; nevertheless, the domestic demands can be expected to show rather rising tendencies.

As for the export possibilities, principal roles will be played obviously by the quality and prices of the final products and their ensuing competitive capacities on the world markets. Both of the factors can be best influenced by the very construction of production facilities in the form of the pilot plant, which has better possibilities of further qualitative and quantitative development as well as the versatility allowing its adaptation for production of other economically more advantageous products, already proposed in the project for future development. On the basis of the present analysis of the proposed production it can be expected that all of the planned products have chances of export of even greater than planned quantities. The only exception is chymotrypsin, a side product of trypsin; the world market demands for chymotrypsin are lower at present.

PEPTONE - The project envisages the production of 32 tons per year. Out of this amount the domestic need is about 1 ton. The rest can be exported in substance. It is mainly required as microbiological nutrient substrate; in view of the recent development of a new industrial branch - production of microbial proteins for feedstuffs - the demand for peptone has a rising tendency.

PEPSIN - The project envisages the production of pepsin in two grades, for the needs of pharmaceutical and of food industries. The product is in steady demand on the world markets, and the whole projected quantity can be exported. In Mongolia the yearly consumption is about 5 kg of pharmaceutical grade pepsin for tablet manufacture for the health care, and about 500 kg of the food grade pepsin for the food industry.

TRYPSIN - At present this enzyme plays a significant role, and practically the whole planned production is exportable, either in the form of sterile substance in vials or of substance in larger packages.
For domestic health care a yearly production of about 50 000 vials of 50 mg trypsin each is considered, corresponding to about 2,5 kg of the enzyme.

CHYMOTRYPSIN - The demand for this proteolytic enzyme is presently lower. Nevertheless, the major part of produced chymotrypsin can be expected to be consumed mainly in the domestic manufacture of the final dispensing form - dusting powder for the treatment of torpid wounds and deep burn injuries. From the yearly produced 20 kg of chymotrypsin, about 100 000 packages of the dusting powder can be manufactured; the surplus exceeding the domestic requirements, which still are difficult to estimate, will be exportable, mainly to the USSR.

PANCYPSIN - This product essentially consists in a mixture of two proteolytic enzymes, prepared from mutton pancreas by a procedure developed at the Research Centre for Applied Enzymology and Microbiology in Ulan Bator. According to the

Mongolian side the product is exportable mainly to Asian markets, in form of either sterile substance in vials with 50 mg each, or in substance in larger packages. The planned yearly production of 87,5 kg of pancypsin should mainly cover the potential export.

CHOLESTEROL - This product represents one of essential components of ointments and cosmetics. Therefore it is much in demand, and the projected yearly production, 700 kg, is exportable to several countries.

PANCREATIN - If of good quality, the product is readily exportable to several countries, besides the domestic consumption. The product is a mixture of all digestive enzymes produced in the pancreas; it serves for pharmaceutical manufacture of enteric coated tablets, but also in tanning, leather, and textile industries and in the manufacture of modern washing preparations. Out of the planned yearly production of 3 tons, a half will be consumed in Mongolia, and the rest can be exported.

BLOOD HYDROLYSATE - The product is mainly destined for domestic manufacture of baby food products. Consequently, the whole planned yearly production of 1860 kg blood hydrolysate is destined for the Mongolian food industry. It has to be emphasized, however, that the blood hydrolysate production could be substantially extended by introducing the manufacture of hydrolysate infusion solutions for the needs of Mongolian health care. This newly introduced manufacture would lead to a substantial enlargement of the blood hydrolysate production, exploitation of practically the entire amount of the basic raw material - beef blood - available, and a reduction of import of hydrolysate infusion solutions. All this, however, would require a substantial extension of the pharmaceutical department for the rooms and equipment necessary for the manufacture of the infusion solutions, and therefore would require a separate project study.

DRIED BILE - Yearly production of 3 900 kg of dried bile is planned. The product is used not only in pharmaceutical manufacture, but also in consumers' goods industries for technical purposes. Out of the projected amount, the Mongolian pharmaceutical manufacture will need about 500 kg for coated tablets of Fel Tauri and Cholenzym, and the Mongolian consumers' goods industry, another 500 kg; the rest can be exported.

MANUFACTURE OF TABLETS AND INJECTIONS - This manufacture is mainly destined for domestic needs. Because the pharmaceutical department has manufacturing capacities exceeding the needs for processing only the products supplied by the projected biochemical department, it will be necessary to supplement the pharmaceutical manufacturing programme by other products required for the Mongolian health care.

Conclusion

For prospective future development of the projected pilot plant there was further proposed the production of serum gonadotropin, heparin, and insulin. All of these products are in strong demand on the world markets, steadily exceeding the supply, and this situation can be also expected in the near future.

The technology of serum gonadotropin is presently in the stage of laboratory research in Mongolia.

Technological procedures of heparin and insulin production have not been studied in Mongolia so far. The experts recommended to the Mongolian side, in view of the importance of both products, to acquire the production know-how from abroad.

SALES FORECAST AND MARKETING

SALES FORECAST

The main products of the pilot plant will be substances. The manufacture of tablets and injections will receive additional substances supplied by the existing pharmaceutical works in Mongolia.

It is expected that the main buyer of exported goods will be the Union of Soviet Socialist Republics; The Hungarian People's Republic, Korean People's Republic, German Democratic Republic, Denmark, and Japan are expected to come next. Some products may also find interest in other countries. Obviously, the export volume is dependent on the quality of the products.

Expected consumption in Mongolia and potential export

Biochemical products

Product	Mongolia kg	Export kg	Total production at pilot plant kg
Peptone	1 000	31 000	32 000
Pepsin , pharmaceutical grade	5	95	100
food grade	500	500	1 000
Chymotrypsin	10	10	20
Trypsin	2,5	9,5	12
Pancypsin	7,5	80	87,5
Cholesterol	100	600	700
Pancreatin	1 500	1 500	3 000
Blood hydrolysate	1 860	-	1 860
Dried bile	1 000	2 900	3 900
Tablets	30 mill.	-	30 mill.
Injections	9 mill.	-	9.mill.

Per cent proportions of domestic consumption and potential export

Product			
Peptone	3,10	96,90	100
Pepsin, pharmaceutical grade	5	95	100
food grade	50	50	100
Chymotrypsin	50	50	100
Trypsin	20,8	79,2	100
Pancypsin	8,6	91,4	100
Cholesterol	14,3	85,7	100
Pancreatin	50	50	100
Blood hydrolysate	100	-	100
Dried bile	25,6	74,4	100
Tablets	100	-	100
Injections	100	-	100

PRODUCTION PROGRAMME

Production programme

The project is the first step of thedevelopment programme of pharmaceutical industry, based on exploitation of domestic raw materials.

The production programme, issuing from research results obtained at the Centre for Applied Enzymology and Microbiology, is intended to cover both the domestic requirements and the export.

The proposed technological project reckons with the following production programme:

Peptone
Pepsin, pharmaceutical grade
Pepsin, food grade
Trypsin
Chymotrypsin
Pancypsin
Cholesterol
Pancreatin
Blood hydrolysate
Dried bile
Tablets
Sterile substances

Serum gonadotropin is much in demand; when the research in Mongolia is finished, the production could be started at the pilot plant.

If know-how for the production of heparin and insulin were obtained from abroad, only a minor supplementation and adaptation of the equipment would allow to include these products into the production programme. This possibility is envisaged in later stages.

Production programme and planned production capacities of the pilot plant:

- Peptone - Pilot-plant production capacity:
  32 tons per year of bacteriological grade peptone
- Pepsin - Pilot-plant production capacity:
  100 kg per year of pharmaceutical grade pepsin,
  1000 kg per year of food grade pepsin
- Trypsin - Pilot-plant production capacity:
  12 kg per year, and
- Chymotrypsin - Pilot-plant capacity:
  20 kg per year.
  A part of the production of both enzymes will be finalized in the form of vials with sterile product; a part, in the form of dusting powder for external use; and the rest, in the form of either sterile or nonsterile substances in bottles.

- Pancypsin - a mixture of proteolytic enzymes pilot-plant production capacity: 87.5 kg per year. It will be used for the same purposes as trypsin and chymotrypsin.

- Cholesterol - a basic component of ointments; major amounts are destined for cosmetic products. Pilot-plant production capacity: 700 kg per year.

- Pancreatin - a mixture of all pancreatic enzymes, used not only for pharmaceutical, but also for leather, tanning, and textile industrial purposes. Pilot-plant production capacity: 3 tons per year.

- Blood hydrölysate - usable for baby-food manufacture. Pilot-plant production capacity: 1 860 tons per year.

  The proposed design utilizes only a part of the raw material - beef blood - available for production of blood hydrolysate for nutritional purposes. A full utilization of available blood might be made possible by potential augmentation of the production programme by blood hydrolysate for infusion solutions.

  The authors of the present feasibility study recommend this alternative as economically advantageous, although the Mongolian side does not intend to realize this variant at the planned pilot plant.

- Dried bile - production of 3 900 kg per year is presumed. A part of the product should be finalized in the form of film-coated tablets, and the rest, in substance. At the pilot plant, as projected, the equipment planned for the production of peptone will partially serve for the production of dried bile.

- Manufacture of tablets - the projected equipment has the capacity of about 6 000 tablets per hour. In tablet form there will be manufactured the domestic Mongolian preparations Cholenzym and Allochol, and out of the recommended Czechoslovak pharmaceutical products, Acipepsol, Pancreolan, Fel Tauri film-coated tablets. All of the specified sorts of tablets will be manufactured of substances produced at the pilot plant in quantities sufficient for domestic consumption. This volume of manufacture will require only 25% of the tablet manufacturing capacity. A full utilization of the whole capacity of the pharmaceutical department is expected from finalization of substances supplied from external production sources, in the volume of 30 million tablets per year.

- Manufacture_of_sterile_products - The projected equipment has a capacity of filling 3 000 vials per hour. Sterile filling is reckoned with of trypsin and chymotrypsin in solution with subsequent freezing and freeze-drying in vials, and of pancypsin in solution with subsequent freezing and freeze-drying in larger /300-ml/ bottles. A full utilization of the projected equipment is expected from filling of solutions of substances produced and supplied by the existing pharmaceutical works in Ulan Bator, up to 9 million vials per year.

Besides the capacities of the production units proper, the capacities of some auxiliary facilities have to be mentioned, which are dimensioned adequately to the expected production volumes.

- Recuperation_of_ethanol_and_acetone - The recuperation capacities of the equipment-
  - ethanol - 250 kg rectificate/hour,
  - acetone - 180 kg rectificate/hour,

correspond to solvent recuperation at the production capacities stated before, at one-shift or two-shift work. A capacity reserve is available partly in the second, and then in the third shifts.

- Production of demineralized and of pyrogen-free water:

  demineralized water, 200 liters per hour,
  pyrogen-free water, 50 liters per hour.

- The capacities of the remaining auxiliary units ensure the operation of the pilot plant.

PLANT CAPACITY

FIGURE 3-1

ESTIMATE OF SALES REVENUES

PRODUCTS [illegible]

DESCRIPTION			YEAR [illegible] 1987 QUANTITIES TO BE SOLD LOC.	EXP.	TOTAL	SALES REVENUES INCLUDING SALES LOC.	EXP.	TOTAL
[illegible]	t	[illegible]	1,0	[illegible]	[illegible]	30	900	930
[illegible] M	t	[illegible]	0,005	[illegible]	[illegible]	45	405	450
[illegible] P	t	[illegible]	0,5	X	[illegible]	400	X	400
[illegible]	t	[illegible]	0,01	X	[illegible]	1600	X	1600
[illegible]	t	[illegible]	0,0025	[illegible]	[illegible]	400	560	960
[illegible]	t	[illegible]	0,0015	[illegible]	[illegible]	[illegible]	5410	[illegible]
[illegible]	t	[illegible]	0,1	[illegible]	[illegible]	[illegible]	30	[illegible]
[illegible]	t	[illegible]	1,5	X	[illegible]	[illegible]	X	[illegible]
[illegible]	t	[illegible]	[illegible]	X	[illegible]	[illegible]	X	[illegible]
[illegible]	t	[illegible]	1,0	0,35	1,35	70	66,5	136,5
[illegible]	[illegible]	[illegible]	15,0	X	[illegible]	[illegible]	X	1950
[illegible]	[illegible]	[illegible]	4,5	X	[illegible]	[illegible]	X	[illegible]
GRAND TOTAL						[illegible]	30215	[illegible]

DESCRIPTION	YEAR (7) [illegible] QUANTITIES TO BE SOLD LOC.	EXP.	TOTAL	SALES REVENUES INCLUDING SALES LOC.	EXP.	TOTAL
[illegible]	1,0	23,0	24,0	60	1380	1440
[illegible] M	0,005	0,07	0,075	45	630	675
[illegible] P	0,5	0,25	0,75	400	200	600
[illegible]	0,01	0,005	0,015	1600	800	2400
[illegible]	[illegible]	0,0065	0,009	400	1040	1440
[illegible]	0,0015	0,0251	0,0266	1050	8134	9184
[illegible]	0,1	[illegible]	[illegible]	20	85	105
[illegible]	1,5	0,75	2,25	120	60	[illegible]
[illegible]	[illegible]	X	1,195	419,2	X	419,2
[illegible]	1,0	1,925	2,925	70	134,75	[illegible]
[illegible]	22,5	X	22,5	2925	X	2925
[illegible]	6,7	X	6,7	[illegible]	X	[illegible]
GRAND TOTAL				11356,1	12463,75	[illegible]

DESCRIPTION	YEAR (8) [illegible] QUANTITIES TO BE SOLD LOC.	EXP.	TOTAL	SALES REVENUES INCLUDING SALES LOC.	EXP.	TOTAL
[illegible]	1,0	[illegible]	20,4	20	[illegible]	[illegible]
[illegible] M	[illegible]	[illegible]	0,085	45	810	[illegible]
[illegible] P	0,5	[illegible]	0,95	400	360	760
[illegible]	0,01	[illegible]	[illegible]	1600	1440	3040
[illegible]	[illegible]	[illegible]	0,0114	400	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1050	[illegible]	[illegible]
[illegible]	0,1	[illegible]	[illegible]	20	113	[illegible]
[illegible]	1,5	[illegible]	[illegible]	120	[illegible]	[illegible]
[illegible]	[illegible]	X	[illegible]	530,1	X	530,1
[illegible]	1,0	[illegible]	[illegible]	70	[illegible]	[illegible]
[illegible]	28,5	X	28,5	3705	X	3705
[illegible]	8,55	X	8,55	5420,7	X	5420,7
GRAND TOTAL				[illegible]	[illegible]	30213,15

DESCRIPTION	YEAR [illegible] 1990 QUANTITIES TO BE SOLD LOC.	EXP.	TOTAL	SALES REVENUES INCLUDING SALES LOC.	EXP.	TOTAL
[illegible]	1,0	31,0	32,0	[illegible]	[illegible]	[illegible]
[illegible] M	0,005	0,095	0,1	45	[illegible]	[illegible]
[illegible] P	0,5	0,5	1,0	400	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1600	[illegible]	[illegible]
[illegible]	0,0025	[illegible]	[illegible]	400	[illegible]	[illegible]
[illegible]	[illegible]	0,08	[illegible]	1050	[illegible]	[illegible]
[illegible]	0,1	0,6	[illegible]	20	120	[illegible]
[illegible]	1,5	1,5	3,0	120	120	[illegible]
[illegible]	1,96	X	[illegible]	[illegible]	X	[illegible]
[illegible]	1,0	2,9	3,9	70	203	[illegible]
[illegible]	30	X	30	[illegible]	X	[illegible]
[illegible]	9	X	9	[illegible]	X	[illegible]
GRAND TOTAL				[illegible]	[illegible]	[illegible]

SCHEDULE 3-3.

PRODUCTION PROGRAMME

PRODUCTS, BY-PRODUCTS, WASTES	UNIT at 100% CAPACITY	PRODUCTION PROGRAMME											
		YEAR 6 (1987)		YEAR 7 (1988)		YEAR 8 (1989)		YEAR 9 (1990)		YEAR 10		YEAR 11	
		CAPACITY (%)	UNITS	CAPACITY (%)	UNITS	CAPACITY (%)	UNITS	CAPACITY (%)	UNITS	CAPACITY (%)	UNITS	CAPACITY (%)	UNITS
PEPTONE	32000 kg	50	16000	75	24000	95	30400	100	32000	100	32000	100	32000
PEPSIN MEDICINAL	100 kg	50	50	75	75	95	95	100	100	100	100	100	100
PEPSIN	1000 kg	50	500	75	750	95	950	100	1000	100	1000	100	1000
CHYMOTRYPSIN	20 kg	50	10	75	15	95	19	100	20	100	20	100	20
TRYPSIN	12 kg	50	6	75	9	95	11,4	100	12	100	12	100	12
PANCYTRIN	87,5 kg	50	43,75	75	65,62	95	83,12	100	87,5	100	87,5	100	87,5
CHOLESTEROL	700 kg	50	350	75	525	95	665	100	700	100	700	100	700
PANCREATIN	3000 kg	50	1500	75	2250	95	2850	100	3000	100	3000	100	3000
BLOOD HYDROLYSATE	1860 kg	50	930	75	1395	95	1767	100	1860	100	1860	100	1860
DRIED BILE	3900 kg	50	1950	75	2925	95	3705	100	3900	100	3900	100	3900
TABLETS	30 mil.	50	15000000	75	22500000	95	28500000	100	30000000	100	30000000	100	30000000
INJECTIONS	9 mil.	50	4500000	75	6750000	95	8550000	100	9000000	100	9000000	100	9000000

CHAPTER IV. MATERIALS AND INPUTS

CONTENTS :

CHARACTERISTICS OF MATERIALS AND INPUTS

IV. Specifications for raw and auxiliary materials

In the pilot-plant operations, both domestic raw materials and other materials imported from abroad, will be processed.

The domestic raw materials consist in slaughterhouse offal, of which the following sorts will be used in the pilot-plant production:

	metric tons per year
1/ Beef pancreas	117
2/ Mutton pancreas	30
3/ Beef rumen and abomasum	552
4/ Pork gastric mucosa	5.2
5/ Spinal cord	18
6/ Beef blood	81,5
7/ Beef and mutton bile	60
8/ Beef gastric mucosa	20

The specified quantities are only fractions of the available amounts of offal.

The offal's sources are slaughterhouse plants in Ulan Bator, Dargham, and Choibalsan. All of these plants are equipped with efficient cooling boxes, ensuring adequate storage of the offal.

SUPPLY PROGRAMME

Raw materials supply planning

A. Domestic raw materials consist in slaughterhouse offal. In Mongolia the livestock is slaughtered in the course of half a year. The slaughterhouse plants are equipped with efficient cool stores, from which the raw materials for the pilot-plant processing can be successively drawn.

The pilot-plant stores are calculated for storage of 400 tons of raw materials, ensuring sufficient reserves for bridging over the period when the slaughterhouse plants are not working. The storage temperature is -20 to -30 °C.

B. Imported raw and auxiliary materials
In view of irregular deliveries of imported chemicals the supply planning must ensure reserves for minimally 4 months. The storerooms for such materials, destined both for chemical and pharmaceutical production, are dimensioned accordingly.

Besides the basic raw materials specified before, the production programme requires certain chemicals not produced in the Mongolian People's Republic.

Raw materials imported from abroad

Item	Grade	Metric tons per year
Sulphuric acid	92 - 96%	5.07
Phosphoric acid	chem. pure	20.8
Calcium oxide - quicklime		65.46
Hydrochloric acid	chem. pure	3.57
Sodium chloride	chem. pure	5.12
Kieselguhr		2
Ethanol	96%	17.9
Acetone	98%	31.36 /39.6 m^3/
Sodium hydrogen carbonate		0.7
Ammonium sulphate	chem. pure	157
Sodium hydroxide solution	40%	0.39
Barium chloride	[illegible]	[illegible]
Magnesium sulfate	chem. pure	0,14
Calcium chloride	chem. pure	0,[illegible]
Oxalic acid	chem. pure	0,[illegible]
Ether	pure	0,0[illegible]
Boric acid	chem. pure	0,17

SCHEDULE 4-1/1
ESTIMATE OF PRODUCTION COST : MATERIALS AND INPUTS

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT NO. A-01 DESCRIPTION: PRODUCTION OF PEPTONE

	ITEM DESCRIPTION	UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
552	BEEF RUMEN AND ABOMASUM	262		144 624	144 624
32	BEEF PANCREAS	15 000		480 000	480 000
208	PHOSPHORIC ACID	254		5 283	5 283
487	CALCIUM OXIDE /QUICKLIME/	167		8 133	8 133
09	HYDROCHLORIC ACID	3 000		2 700	2 700
	AUXILIARY MATERIALS			76 812	76 812
$162 10^3$ KWH	ELECTRIC ENERGY	180		29 160	29 160
$2\ 10^3$	STEAM	17		34 000	34 000
$40 10^3$ m^3	WATER	04		16 000	16 000
	TOTAL			796 712	796 712

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 4-2

SCHEDULE 4-1/2

ESTIMATE OF PRODUCTION COST : MATERIALS AND INPUTS

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT NO. A-02 DESCRIPTION: PRODUCTION OF PEPSIN

No.		ITEM DESCRIPTION	UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
20	t	BEEF GASTRIC MUCOSA	2700		5400	5400
5,2	t	PORK GASTRIC MUCOSA	1710		8892	8892
1,1	t	HYDROCHLORIC ACID	3000		3300	3300
4,8	t	SODIUM CHLORIDE	3900		18720	18720
17	m^3	ETHANOL	9200		156400	156400
		AUXILIARY MATERIALS			18500	18500
$52 \cdot 10^3$	kWh	ELECTRIC ENERGY	0,18		9360	9360
$150 \cdot 10^3$	t	STEAM	17		2550000	2550000
		TOTAL			2770572	2770572

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 4-2/

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT No.A-03 DESCRIPTION: PRODUCTION OF TRYPSIN, CHYMOTRYPSIN, PANCYPSIN

No.		ITEM DESCRIPTION	UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
20	t	BEEF PANCREAS				
30						
35						
85			15000		1 275000	1 275000
0,84	t	SULPHURIC ACID	4290		3603	3603
1,57	t	HYDROCHLORID ACID	3000		4710	4710
156,6	t	AMMONIUM SULPHATE	8900		1 393740	1 393740
0,3	t	KIESELGUHR	20000		6000	6000
0,32	t	SODIUM CHLORIDE	3900		1248	1248
0,493	t	BARIUM CHLORIDE	20000		9860	9860
0,39	t	SODIUM HYDROXIDE 40%	18000		7038	7038
0,137	t	MAGNESIUM SULPHATE	2500		342,5	342,5
		OTHER MATERIALS				6000
		AUXILIARY MATERIALS			120000	120000
25.10^3	KWh	ELECTRIC ENERGY	0,18		4500	4500
20	m^3	WATER	0,4		8	8
		TOTAL			2,8320495	2832049,5

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 4-2//

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT No.A-04 DESCRIPTION: PRODUCTION OF CHOLESTEROL

No		ITEM DESCRIPTION	UNIT COST US Dollars	COST FOREIGN	COST LOCAL Tg	COST TOTAL Tg
18 t		SPINAL CORD	1 400		25 200	25 200
6 t		ACETONE	5 000		30 000	30 000
0,9 m^3		ETHANOL	9 200		8 280	8 280
0,36 t		SULPHURIC ACID	4 290		1 544	1 544
		AUXILIARY MATERIALS			7 550	7 550
3.10^3 KWH		ELECTRIC ENERGY	0,18		540	540
72 t		STEAM	17		1 224	1 224
500 m^3		WATER	0,4		200	200
		TOTAL			74.488,-	74.488,-

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 4-2/

ESTIMATE OF PRODUCTION COST : MATERIALS AND INPUTS

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT No.A-05 DESCRIPTION: PRODUCTION OF PANCREATIN

No.		ITEM DESCRIPTION	UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
30	t	MUTTON PANCREAS	15000		450 000	450 000
0,75	t	SODIUM HYDROGEN CARBONATE	5360		4 020	4 020
33,6	m^3	ACETONE	5000		168 000	168 000
		AUXILIARY MATERIALS			64 000	64 000
6.10^3	KWh	ELECTRIC ENERGY	0,18		1 080	1 080
20	t	STEAM	17		340	340
		TOTAL			687.440,-	687.440,-

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 4-2/

SCHEDULE 4-1/6

ESTIMATE OF PRODUCTION COST : MATERIALS AND INPUTS

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT No.A-06 DESCRIPTION : PRODUCTION OF BLOOD HYDROLYSATE

		ITEM DESCRIPTION	UNIT COST	COST FOREIGN	COST LOCAL	TOTAL
				US Dollars	Tg	Tg
81,5	t	BEEF BLOOD	1 400		114 100	114 100
2,87	t	SULPHURIC ACID	4 290		12 312	12 312
2,76	t	CALCIUM OXIDE /QUICKLIME/	167		461	461
		AUXILIARY MATERIALS			10 000	10 000
37440	KWh	ELECTRIC ENERGY	0,18		6 740	6 740
500	t	STEAM	17		8 500	8 500
2880	m^3	WATER	0,4		1 152	1 152
		TOTAL			153.265-	153.265

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 4-2//

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT No.A-07 DESCRIPTION : PRODUCTION OF DRIED BILE

	ITEM DESCRIPTION	UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
60 t	MUTTON AN BEEF BILE	980		58 800,-	58 800,-
1660KWh	ELECTRIC ENERGY	0,18		299,-	299,-
115 t	STEAM	17		1 955,-	1 955,-
1100 m^3	WATER	0,4		440,-	440,-
	TOTAL			61 494,-	61.494,-

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 4-2/

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT No.A-08 DESCRIPTION : MANUFACTURE OF TABLETS

	ITEM DESCRIPTION	UNIT COST	COST FOREIGN US Dollars	LOCAL Tg	TOTAL Tg
	AUXILIARY MATERIALS - COSTS SPECIFIED WITH PRODUCTS				
8000KWh	ELECTRIC ENERGY	0,18		1.440,-	1.440,-
	TOTAL			1.440,-	1.440,-

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 4

ESTIMATE OF PRODUCTION COST : MATERIALS AND INPUTS

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT No.A-09 DESCRIPTION : MANUFACTURE OF STERILE PREPARATIONS

	ITEM DESCRIPTION	UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
	AUXILIARY MATERIALS - COSTS SPECIFIED WITH PRODUCTS				
30000KWh	ELECTRIC ENERGY	0,18		5.400,-	5.400,-
80 t	STEAM	17		1.360,-	1.360,-
	TOTAL			6.760,-	6.760,-

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 4-

ESTIMATE OF PRODUCTION COST : MATERIALS AND INPUTS

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT No.A-11 DESCRIPTION : SOLVENT RECUPERATION PLANT

		ITEM DESCRIPTION	UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
5500	KWh	ELECTRIC ENERGY	0,18		990,-	990,-
950	t	STEAM	17		16.150,-	16.150,-
8350	m^3	WATER	0,4		3.340,-	3.340,-
		TOTAL			20.480,-	20.480,-

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 4-2//

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT No.A-12 DESCRIPTION : DEMINERALIZED AND PYROGENFREE WATER PLANT

	ITEM DESCRIPTION	UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
400 m^3	WATER	0,4		160,-	160,-
120 t	STEAM	17		2.040,-	2.040,-
2460 m^3	WATER	0,4		984,-	984,-
	TOTAL			3.184,-	3.184,-

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 4-2/

ESTIMATE OF PRODUCTION COST

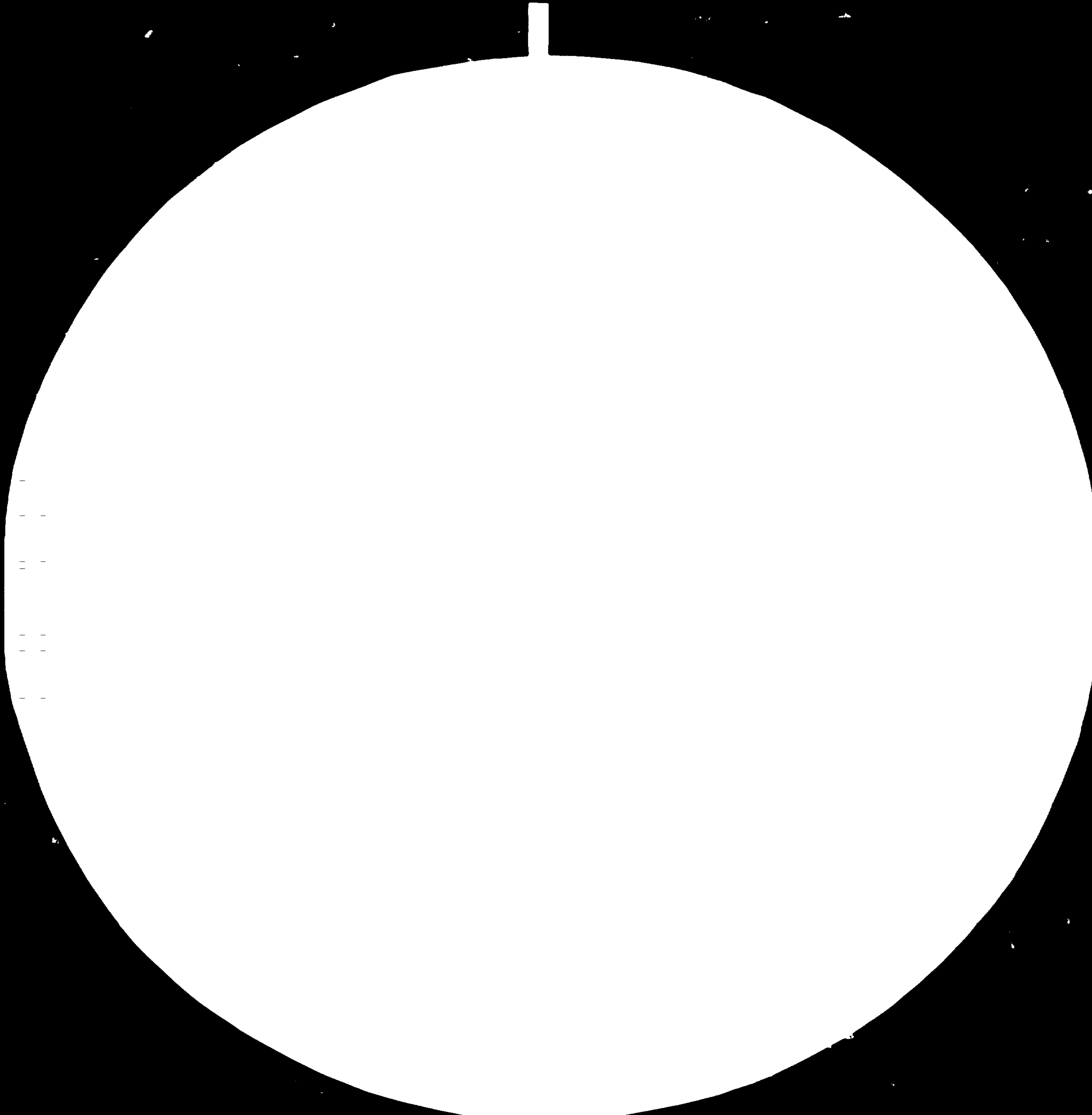
MATERIALS AND INPUTS

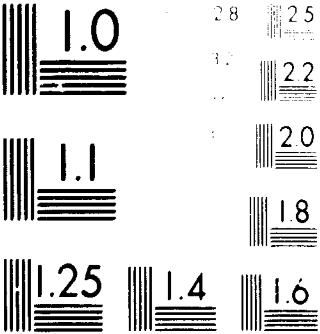
PROJECT COMPONENT No.A-14 DESCRIPTION : NEUTRALIZATION STATION

		ITEM DESCRIPTION	UNIT COST	COST FOREIGN US Dollars	LOCAL Tg	TOTAL Tg
1	t	SULPHURIC ACID	4.290		4.290,-	4.290,-
14	t	CALCIUM OXIDE /QUICKLIME/	167		2.338,-	2.338,-
4610KWH		ELECTRIC ENERGY	0,19		8.280,-	8.280,-
		TOTAL			14.908,-	14.908,-

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 4-2//

82 09 24

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ESTIMATE OF PRODUCTION COST : MATERIALS AND INPUTS

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT No.A-15 DESCRIPTION : STORAGE OF INFLAMMABLE SOLVENTS

	ITEM DESCRIPTION	UNIT COST FOREIGN US Dollars	COST LOCAL Tg	TOTAL Tg
800KWH	ELECTRIC ENERGY	0,18	144,-	144,-
	TOTAL		144,-	144,-

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 4-

ESTIMATE OF PRODUCTION COST : MATERIALS AND INPUTS

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT No.A-16 DESCRIPTION : PRESSURE AIR AND VACUUM CENTRAL

	ITEM DESCRIPTION	UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
50.000 KWH	ELECTRIC ENERGY	0,18		9.000,-	9.000,-
1000 m^3	WATER	0,4		400,-	400,-
	[illegible]			9.400,-	[illegible],-

[illegible] NENT TO SUMMARY SHEET /SCHEDULE 4-[illegible]

SCHEDULE 4-1/15

ESTIMATE OF PRODUCTION COST : MATERIALS AND INPUTS

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT No.A-17 DESCRIPTION : COOLING PLANT

		ITEM DESCRIPTION	UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
158010	KWh	ELECTRIC ENERGY	0,18		284.400,-	284.400,-
		TOTAL			284.400,-	284.400,-

CARRY OVER TOTAL OF [illegible] COMPONENT TO SUMMARY SHEET /SCHEDULE 4-2/

ESTIMATE OF PRODUCTION COST : MATERIALS AND INPUTS

ESTIMATE OF PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT No.A-19 DESCRIPTION : AIR CONDITIONING

	ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg.	COST TOTAL Tg.
34.10 KWh	ELECTRIC ENERGY		0,18		6.120,-	6.120,-
	TOTAL				6.120,-	6.120,-

/CARRY OVER TOTAL OF THE PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 4-2//

SUMMARY SHEET - PRODUCTION COST

MATERIALS AND INPUTS

PROJECT COMPONENT		PRODUCTION COST CARRIED OVER		
No.	DESCRIPTION	FOREIGN	LOCAL Rp	TOTAL Rp
A-01	PRODUCTION OF PEPTONE		796712,-	796712,-
A-02	PRODUCTION OF PEPSIN		2770572,-	2770572,-
A-03	PRODUCTION OF TRYPSIN, CHYMOTRYPSIN, PANCYPSIN		2832049,5	2832049,5
A-04	PRODUCTION OF CHOLESTEROL		74488,-	74488,-
A-05	PRODUCTION OF PANCREATIN		687440,-	687440,-
A-06	PRODUCTION OF BLOOD HYDROLYSATE		153265,-	153265,-
A-07	PRODUCTION OF DRIED BILE		61494,-	61494,-
A-08	MANUFACTURE OF TABLETS		1440,-	1440,-
A-09	MANUFACTURE OF STERILE PREPARATIONS		6760,-	6760,-
A-11	SOLVENT RECUPERATION PLANT		20480,-	20480,-
A-12	DEMINERALIZED AND PYROGENFREE WATER PLANT		3184,-	3184,-
A-14	NEUTRALIZATION STATION		14908,-	14908,-
A-15	STORAGE OF INFLAMMABLE SOLVENTS		144,-	144,-
A-16	PRESSURE AIR AND VACUUM CENTRAL		9400,-	9400,-
A-17	COOLING PLANT		284400,-	284400,-
A-19	AIR CONDITIONING		6120,-	6120,-
	TOTAL		7,722856,5	7,722856,5

[illegible]

[illegible]

[illegible]

[illegible]

1958. [illegible] /25,50 кг/

№ п/п	[illegible]	Ед. изм.	[illegible]		[illegible]
			[illegible]	10 кг	
1.	[illegible]	[illegible]	1,65	[illegible]	[illegible]
2.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4.	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	[illegible]
5.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13.	[illegible]	[illegible]	5,75	57,5	[illegible]
14.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

№ п/п	[illegible]	Ед. изм.	1 кг	10 кг	[illegible]
1.	[illegible]	[illegible]	10,0	[illegible]	[illegible]
2.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10.	[illegible]	[illegible]	220,0	[illegible]	[illegible]

РАСЧЕТ ПОТРЕБНОСТИ И СТОИМОСТИ СЫРЬЯ И МАТЕРИАЛОВ ДЛЯ ПРОИЗВОДСТВА 10 КГ "ХИМОТРИПСИНА" /РАСФАСОВКОЙ ПО 5 КГ И ПО 100 ГР /

П/П №	Сырье и основные материалы	ед. изм.	Норма расхода на 1 кг	Норма расхода на 10 кг	цена за единицу /тугр/	сумма /тыс.тугр/
I.	Поджелудочная железа крупного рогатого скота	тн	I,0	I0,0	I5-00	I5[illegible]
2.	Аммоний сернокислый х.ч.	тн	I,6	I6,0	[illegible]-9[illegible]	I4[illegible],7
3.	Серная кислота х.ч.	кг	40,0	400,0	4-29	I,7
4.	Натр едкий х.ч.	кг	I,0	I0,0	[illegible]	[illegible]
5.	Спирт ректификат	абс.л	8,3	83,0	[illegible]	[illegible]
6.	Фосфат натрия двухзамещенный х.ч.	кг	[illegible],5	I5,0	I-7[illegible]	0,0[illegible]
7.	Фосфат калия однозамещенный х.ч.	кг	0,3	3,0	9-67	0,[illegible]
8.	Кизельгур	кг	I0,0	I00,0	20-0[illegible]	2,0
9.	Барий хлористый х.ч.	кг	I0,4	I04,0	20-00	2,03
I0.	Смола [illegible]-2	кг	0,5	5,0	[illegible]-I9	0,[illegible]
II.	Соляная кислота х.ч.	кг	[illegible],3	I43,0	[illegible]	0,[illegible]
I2.	Ацетон ч.д.а.	л	I,2	I2,0	5-[illegible]	[illegible]
I3.	Сульфат магния х.ч.	кг	[illegible],0	40,0	[illegible]-50	0,I
I4.	Натр хлористый х.ч.	кг	I0,2	I0[illegible],0	[illegible]-90	0,4
I5.	ИТОГО					I5[illegible]
	ВСПОМОГАТЕЛЬНЫЕ МАТЕРИАЛЫ					
I.	Фильтровальная бумага	кг	4I,0	4I0,0	[illegible]	[illegible]
2.	Подпергамент	кг	I,I	II,0	27-[illegible]	0,[illegible]
3.	Оберточная бумага	кг	0,4	4,0	7-[illegible]0	0,[illegible]
4.	Марля	м	I0,0	[illegible]	[illegible]	[illegible]
5.	Бязь	м	I5,0	I[illegible]0,0	6-[illegible]	0,[illegible]
6.	Шелковое полотно	м	2,0	20,0	I0-00	0,[illegible]
7.	Вата	кг	5,0	50,0	5-00	0,25
8.	Фильтровальные пластины	шт	50,0	500,0	[illegible]	I,5
9.	Флаконы 5 мг	тыс.шт	220,0	II00,0	437-00	535,7
I0.	Пробки резиновые	тыс.шт	220,0	II00,0	879-00	4I6,9
II.	Колпачки металлические	-"-	220,0	II00,0	I84-00	I47,4
I2.	Коробки литографические	-"-	220,0	II00,0	70-00	77,0
I3.	Вкладыши	-"-	220,0	II00,0	20-00	22,0

14.Инструменты	тыс.шт	220,0	1100,0	[illegible]	[illegible]
15.[illegible]	шт	11,0	55,0	[illegible]	[illegible]
16.[illegible]	шт	40,0	400,0	5-00	[illegible]
17.[illegible]	шт	25,0	250,0	[illegible]	[illegible]
18.[illegible]	шт	100,0	1000,0	10-00	[illegible]
19.[illegible]	кг	20,0	200,0	40-00	[illegible]
20.Гвозди	кг	0,8	8,0	2-00	[illegible]
21.Корм животных					[illegible]
ВСЕГО					[illegible]

РАСЧЕТ СТОИМОСТИ СЫРЬЯ

п/п.	Наименование сырья и материалов	Ед. изм.	цена за единицу	кол-во	Сумма /тыс. руб/
	I. Сырье.				
1.	Поджелудочная железа крупного рогатого скота	тн	[illegible]	[illegible]	[illegible]
2.	Поджелудочная железа мелкого рогатого скота	тн	[illegible]000-00	[illegible],0	[illegible]
3.	Сухая желчь	тн	[illegible]	[illegible]	[illegible]
4.	Трахеи	тн	[illegible]	[illegible]	[illegible]
5.	Копыта	тн	[illegible]000-00	[illegible],0	[illegible],0
6.	Рубцы и [illegible]	тн	[illegible]	[illegible]	[illegible],7
7.	Слизистая оболочка сычугов крупного рогатого скота	тн	[illegible]	[illegible]	[illegible]
8.	Спинной мозг крупного рогатого скота	тн	1410-00	[illegible]	[illegible]
9.	Кровь крупного рогатого скота	тыс.л	500-00	[illegible]	[illegible],7
10.	Глаза крупного и мелкого рогатого скота	тн	800-00	10,0	8,0
11.	Рога и копыта	тн	800-00	500,0	400,0
[illegible]	[illegible]	тн	[illegible]	[illegible]	[illegible]
[illegible]	Селезенки	тн	[illegible]	[illegible]	[illegible]
	ВСЕГО				[illegible],5
	II. [illegible] материалы:				
[illegible]	Аммоний сернокислый х.ч	тн	[illegible]	[illegible]	[illegible]
2.	Серная кислота х.ч	кг	4-29	6112,5	26,22
3.	[illegible] I о.ф.т.	кг	0,45	1937,0	0,87
4.	Натр едкий х.ч	кг	18-00	3473,0	62,51
5.	Смола КУ-2	кг	36-19	165,0	5,97
6.	Натрий хлористый х.ч	кг	3-[illegible]	[illegible]	[illegible]
7.	[illegible]	тыс.л	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	кг	[illegible]	[illegible]	[illegible]
9.	Кизельгур	кг	20-00	3647,6	72,95
10.	Соляная кислота х.ч	кг	3-00	516530,0	1549,6
11.	Сульфат магния х.ч	кг	2-50	4335,3	10,84
12.	Борная кислота х.ч	кг	12-00	269,0	3,[illegible]

[illegible]. Ацетон чистый для анализа	л	6-[illegible]		
[illegible]. [illegible]	кг	10-10	[illegible],[illegible]	[illegible]
15. [illegible] х.ч	кг	6-[illegible]	[illegible],0	0,[illegible]
16. [illegible] натрий [illegible] х.ч	кг	1-70	10,0	[illegible]
17. [illegible] калий [illegible] х.ч	кг	3-07	[illegible],0	0,[illegible]
18. [illegible] чистый для анализа	кг	18-00	[illegible],0	[illegible],0
19. [illegible] уксусная кислота х.ч	кг	10-00	[illegible],0	[illegible]
20. Анилин [illegible] х.ч	кг	11-17	[illegible],0	[illegible]
21. [illegible] уксуснокислый х.ч	кг	3-[illegible]	[illegible],0	0,[illegible]
[illegible]. [illegible] х.ч	кг	20-57	0,[illegible]	0,[illegible]
[illegible]. [illegible] чистый для анализа	кг	10-13	[illegible],0	[illegible]
[illegible]. [illegible] кислота х.ч	кг	48-13	[illegible],0	0,[illegible]
[illegible]. [illegible] калий х.ч	кг	1[illegible]-6[illegible]	[illegible],0	[illegible]
[illegible]. [illegible] х.ч	кг	50-00	[illegible],0	[illegible]
[illegible]. [illegible] пудра	кг	2-20	[illegible],0	[illegible]
[illegible]. [illegible] кислота х.ч	кг	10-00	[illegible],0	[illegible]
[illegible]. [illegible] технический	кг	0-21	[illegible],0	0,[illegible]
[illegible]. Активированный уголь	кг	4-00	[illegible],0	[illegible]
[illegible]. [illegible] сухой	кг	7-00	[illegible],0	[illegible]
[illegible]. [illegible] сухой	кг	10-00	[illegible],0	[illegible]
[illegible]. [illegible] х.ч	кг	8-[illegible]	[illegible],0	[illegible]
[illegible]. [illegible]	кг	0,75	[illegible],0	[illegible]
[illegible]. [illegible]	л	[illegible]-[illegible]	[illegible],0	[illegible]
[illegible]. [illegible]	кг	[illegible]	[illegible],0	[illegible]
[illegible]. [illegible] х.ч	кг	7-70	[illegible],0	[illegible]
[illegible]. [illegible] технический	кг	[illegible]	[illegible]	[illegible]
[illegible]. [illegible]	кг	[illegible]	[illegible],0	[illegible]
[illegible]. [illegible]	кг	4-00	[illegible],[illegible]	[illegible]
[illegible]. [illegible] х.ч	кг	50-00	[illegible]	[illegible]
[illegible]. [illegible]	кг	6-00	[illegible],0	[illegible]
[illegible]. [illegible] х.ч	кг	40-00	[illegible],0	[illegible]
[illegible]. Парафин	кг	0,01	[illegible]	[illegible]
[illegible]. [illegible] х.ч	кг	[illegible]-00	[illegible],0	[illegible]
[illegible]. [illegible]	м	—	[illegible],0	—
[illegible]. [illegible] х.ч	кг	[illegible]	[illegible]	0,[illegible]
[illegible]. [illegible]	кг	[illegible]-00	[illegible]	[illegible]
[illegible]. [illegible]	кг	[illegible]-75	[illegible]	[illegible]
[illegible]. [illegible] х.ч	кг	9-[illegible]	[illegible]	[illegible]

[illegible] х/ч	шт	2[illegible]-0[illegible]		
[illegible]	шт	7-[illegible]	[illegible],0	0,[illegible]
[illegible] х/ч	шт	2[illegible]-[illegible]0	7[illegible],0	[illegible]
[illegible]	шт	107-00	[illegible],0	[illegible]
[illegible]	шт	0-[illegible]	[illegible],0	0,[illegible]
[illegible] технический	шт	9-00	[illegible],0	[illegible]
[illegible]7. [illegible] х/ч	шт	[illegible]-[illegible]	[illegible],0	[illegible],7
[illegible]	шт	[illegible]	[illegible],0	0,[illegible]
[illegible]	шт	1-44	[illegible],0	[illegible]
[illegible]	шт	[illegible]-19	1[illegible],0	0,[illegible]
[illegible]	шт	5-[illegible]	[illegible],0	[illegible]
[illegible]	абс.л	4-0[illegible]	[illegible],0	[illegible]

[illegible] 10

2. [illegible]

[illegible] бумага	шт	7-00	[illegible]	[illegible]
2. [illegible] бумага	шт	[illegible]-00	[illegible]	[illegible]
[illegible]	шт	[illegible]-00	[illegible]	[illegible]
4. [illegible] 1000 [illegible]	шт	[illegible]-[illegible]0	[illegible]	[illegible]
[illegible]	шт	[illegible]7-[illegible]	[illegible]	[illegible]
6. [illegible]	шт	[illegible]0-00	[illegible]	[illegible]
7. [illegible]	шт	[illegible]-00	[illegible]	[illegible]
[illegible]	м	2-[illegible]0	[illegible]	[illegible]
[illegible]	м	[illegible]	[illegible]	[illegible]
[illegible]	шт	[illegible]	[illegible]	[illegible]
[illegible]	м	1[illegible]-00	[illegible]	[illegible]
[illegible]	шт	0-7[illegible]	[illegible]	[illegible]
[illegible]	шт	5-00	[illegible]	7,[illegible]
[illegible]	м	7-[illegible]	[illegible]	[illegible]
[illegible]	шт	4[illegible]-[illegible]0	[illegible]	[illegible]
[illegible]	шт	27-[illegible]	[illegible]	[illegible]
[illegible]	шт	0-6[illegible]	[illegible]	[illegible]
[illegible]	шт	0-[illegible]0	7[illegible],0	[illegible],7
[illegible]	шт	1-21	[illegible]	[illegible]
[illegible]	шт	0-70	[illegible]	[illegible]
[illegible] технический	абс.л	4-04	[illegible]	[illegible]
[illegible] полотно	м	10-00	[illegible]	[illegible]
[illegible]	шт	[illegible]-00	[illegible]	7,[illegible]
[illegible]	шт	16-00	[illegible]	[illegible]7,
[illegible]	тыс.шт	427-00	7[illegible],0	[illegible]
[illegible]	тыс.шт	570-00	7[illegible]	7,[illegible]
[illegible]	тыс.шт	[illegible]4-00	[illegible]	[illegible]

28. [illegible]	тыс.шт	70-00	[illegible]	[illegible]
29. [illegible]	тыс.шт	20-00	7[illegible],0	[illegible]
30. [illegible]	-"-	16-00	[illegible],2	[illegible]7,7
31. [illegible]	г	0,01	[illegible]	[illegible]
32. [illegible]	тыс.тугр		[illegible],4	[illegible]
33. Прочие материалы	-"-		[illegible],4	[illegible]
34. [illegible]	шт	40-[illegible]	[illegible],0	[illegible]
35. [illegible] ч.п.л	шт	10-00	7[illegible],0	[illegible]
36. [illegible] резиновые	шт	5-00	7[illegible],0	[illegible]
37. [illegible] нить	шт	[illegible]-00	[illegible]	[illegible],7
38. [illegible]	шт	[illegible]-00	[illegible],0	[illegible]
39. [illegible] сито	м	[illegible]	[illegible],0	[illegible],7
40. [illegible]	л	1-[illegible]	[illegible]	[illegible]
41. Свечи-фильтровальные	шт	10-[illegible]	[illegible]	[illegible]
42. [illegible]	тыс.шт	0,[illegible]	[illegible],0	[illegible]
43. [illegible]	шт	6-[illegible]	[illegible],2	[illegible]
44. [illegible]	шт	6-47	[illegible],0	[illegible]
ИТОГО				[illegible]

ИТОГО	[illegible]

[illegible] СТОИМОСТИ [illegible]
[illegible]
[illegible] /[illegible]/

п/п	Сырье и основные материалы	Ед. изм.	Норма	[illegible]	[illegible] /руб/	[illegible] /тыс.руб/
1.	[illegible] рошного [illegible]	тн	0,4	[illegible]	[illegible]	[illegible]
2.	[illegible]	тн	[illegible]	[illegible]	[illegible]	[illegible]
3.	Аммоний сернокислый х,ч	кг	140,5	[illegible]	[illegible]	[illegible]
4.	[illegible] х,ч	кг	[illegible]	[illegible]	[illegible]	[illegible]
5.	[illegible] х,ч	кг	4,0	[illegible]	[illegible]	[illegible]
6.	[illegible]	кг	[illegible],0	[illegible]	[illegible]	[illegible]
7.	[illegible] кислота х,ч	кг	8,0	[illegible]	[illegible]	[illegible]
8.	[illegible] х,ч	кг	0,25	[illegible]	[illegible]	[illegible]
9.	[illegible] х,ч	кг	0,6	[illegible]	[illegible]	[illegible]
10.	[illegible] кислота х,ч	кг	1,6	[illegible]	[illegible]	[illegible]
11.	Спирт ректификат х,ч	абс.л	0,4	[illegible]	[illegible]	[illegible]
12.	[illegible]	кг	1,0	[illegible]	[illegible]	[illegible]
13.	[illegible]	кг	0,1	[illegible]	[illegible]	[illegible]
14.	[illegible]	м	3,0	[illegible]	[illegible]	[illegible]
15.	[illegible] х,ч [illegible]	кг	20,0	[illegible]	[illegible]	[illegible]
	[illegible]ГО:					[illegible]

[illegible]:

1.	[illegible] фильтр	кг	50,0	[illegible]	[illegible]	[illegible]
2.	[illegible]	кг	[illegible],5	[illegible]	[illegible]	[illegible]
3.	[illegible] фильтр	кг	[illegible],0	[illegible]	[illegible]	[illegible]
4.	[illegible] полотно	м	[illegible],5	[illegible]	[illegible]	[illegible]
5.	[illegible]	м	[illegible],0	[illegible]	[illegible]	[illegible]
6.	[illegible]	м	[illegible],0	[illegible]700,0	[illegible]	[illegible]
7.	[illegible] пластины	кг	[illegible],0	[illegible]	[illegible]	[illegible]
8.	[illegible]	кг	5,0	[illegible]	[illegible]	[illegible]
9.	[illegible]	кг	2,0	[illegible]	[illegible]	[illegible]
10.	[illegible]	кг	0,5	[illegible]	[illegible]	[illegible]

II. [illegible]	-"-	5,0	[illegible]	[illegible]	[illegible]
I2. [illegible] нить	-"-	[illegible],0	[illegible]	[illegible]	0,[illegible]
I3. [illegible]	шт	[illegible],0	[illegible],0	[illegible]	[illegible]
I4. [illegible] 5 шт	тыс.шт	44,0	[illegible]	[illegible]	[illegible]
I5. [illegible] резиновые	-"-	44,0	[illegible]	[illegible]	[illegible]
I6. [illegible] металлические	-"-	44,0	[illegible]	[illegible]	[illegible]
I7. [illegible] литографические	-"-	44,0	[illegible]	[illegible]	[illegible]
I8. [illegible]	-"-	44,04	[illegible],0	[illegible]	[illegible]
I9. Инструменты	-"-	44,[illegible]	[illegible],0	[illegible]	[illegible]
20. [illegible]	шт	3,0	[illegible],0	[illegible]	[illegible]
2I. [illegible]	-"-	5,5	[illegible],0	50-00	[illegible]
22. [illegible]	-"-	44,4	[illegible],0	IO-00	[illegible]
23. Гвозди	кг		[illegible]	[illegible]	[illegible]
24. [illegible] емкостью I л	шт	IO,0	[illegible],0	[illegible]	[illegible]
25. [illegible]	г	500	[illegible],0	[illegible]	[illegible]
26. [illegible]					[illegible]
ИТОГО:					[illegible]

[illegible] И СТОИМОСТИ СЫРЬЯ И [illegible]
[illegible] 50 ТН "[illegible]" /[illegible]
I ТН [illegible]/

п/п	Сырье и основные материалы	Ед. изм.	Норма расхода на I тн	Норма расхода на 50 тн	[illegible] /[illegible]/	[illegible] /[illegible]/
I.	[illegible]	тн	I7,0	[illegible],0	[illegible]-00	[illegible],7
2.	[illegible] обсточка сину- [illegible] [illegible]	тн	I,0	[illegible],0	[illegible]-700	[illegible]
3.	[illegible] полоса	тн	0,[illegible]	[illegible],0	[illegible]-00	[illegible],0
4.	[illegible] кислота х,ч	тн	I,5	7[illegible],0	[illegible]-00	[illegible]
5.	Негашеная известь	тн	6,5	[illegible],0	[illegible]7-00	[illegible]
	ИТОГО:					[illegible],7[illegible]
	[illegible] МАТЕРИАЛЫ					
I.	Полиэтиленовый мешок	шт	I700,0	[illegible],0	[illegible]-70	[illegible]
2.	[illegible]	кг	2,0	[illegible],0	[illegible]	[illegible]
3.	[illegible]	шт	I00,0	5[illegible],0	[illegible]	[illegible]
4.	[illegible]	кг	0,I	[illegible],0	[illegible]-00	[illegible]
5.	[illegible]ит	кг	2,2	[illegible],0	[illegible]	[illegible]
6.	[illegible]	м	[illegible]0,0	[illegible]000,0	[illegible]	
7.	[illegible]	шт	I,0	[illegible],0	[illegible]	
8.	[illegible] бумага	кг	[illegible]0,0	4[illegible],0	[illegible]	[illegible]
9.	[illegible]	шт	[illegible]00,0	[illegible],0	[illegible]	[illegible]
I0.	[illegible]	шт	[illegible]00,0	[illegible]	[illegible]	[illegible]
II.	Прочие материалы					[illegible]
	ИТОГО:					[illegible]

РАСЧЕТ ПОТРЕБНОСТИ И СТОИМОСТИ СЫРЬЯ И МАТЕРИАЛОВ ДЛЯ ПРОИЗВОДСТВА НА 600 КГ "ХОЛЕСТЕРИНА" /РАСФАСОВКОЙ ПО 20 КГ В УПАКОВКЕ/

Сырье и основные материалы	Ед. изм	норма расхода на I кг	норма расхода на 600 кг	Цена /туг/	Сумма /тыс.туг/
I. Спинной мозг	кг	22	I3200,0	I-4I	I8,6I
2. Спирт ректификат	абс.л	3,54	2I24,0	I30-00	I38,06
3. Ацетон	л	5,0	3000,0	5-00	I5,00
4. Серная кислота х,ч	кг	0,5	300,0	4-29	I,29
5. Уголь активированный	кг	0,06	36,0	4-50	0,I5
ВСЕГО:					I54,5
ВСПОМОГАТЕЛЬНЫЕ МАТЕРИАЛЫ					
I. Подпергамент	кг	0,03	I8,0	27-28	0,50
2. Сукно Бэтта	м	0,0I3	7,8	I5-00	0,I2
3. Бязь	м	0,02	I2,0	3-80	0,05
4. Бельтинг	м	0,02	I2,0	7-62	0,I0
5. Фильтровальная бумага	кг	0,02	I2,0	3-00	0,04
6. Оберточная бумага	кг	0,02	I2,0	7-60	0,I0
7. Полиэтилен	кг	0,007	4,2	6-20	0,03
8. Ящики	шт	0,05	30	I0-00	0,30
9. Прочие материалы					0,04
I0. Гвозди		0,00I	0,62		0,0I
ВСЕГО:					I,29

I1.	Коробки литографические	тыс.шт	220,0	II00,0	70-00	77,0
I2.	Вкладыши	тыс.шт	220,0	II00,0	20-00	22,0
I3.	Инструкции	тыс.шт	220,0	II00,0	I6-00	I7,6
I4.	Мыши	шт	40,0	400,0	5-00	2,0
I5.	Кролики	шт	25,0	250,0	50-00	I2,5
I6.	Ящики	шт	I00,0	I000,0	I0-00	I0,0
I7.	Гвозди	кг	0,3	3,0	2-00	0,0I
I8.	Целлофан	кг	20,0	200,0	40-00	8,0
I9.	Вата	кг	0,3	3,0	5-00	0,02
20.	Корм животных	кг				0,6
	ВСЕГО:					I256,29

CHAPTER V. LOCATION AND SITE

CONTENTS:

LOCATION

The all-state territorial conditions in Mongolia for the selection of a locality suitable for the development of biochemical production for the pharmaceutical industry issue from an exploration of the whole territory. Principially such a locality must have sufficient sources of raw materials in the form of slaughterhouse offal. In Mongolia three slaughterhouse plants are operating at present. The largest of them is located in the capital city Ulan Bator. Therefore the decision was made, in the all-national interest as well as in accordance with the plant operation economy, to build up an integrated biochemical works in this locality. The largest raw material source as well as technologically and technically skilled personnel are available on the spot. The general infrastructure is advantageous /labourers, lodging facilities, social funds/, and the connection with the urban agglomeration is immediate. The distance between the biochemical integrated works and the slaughterhouse plant is about 1 kilometer, and communication interconnexion will be ensured by a city roadway.

SITE

The projected biochemical pilot plant will be a part of the planned biochemical integrated plant in Ulan Bator. The Mongolian party had prepared 5 building lots for selection. Upon the expert team's recommendation a lot in the west part of the city was selected. According to the master extension plan the territory concerned lies within a future industrial zone. The Mongolian party offers the lot cost-free.

The lot concerned has the following advantages:

I. from the transportation aspect, a possibility of connexion with the city roadway network and railroad;

II. a favourable localization near the main raw material basis;

III. a possibility of immediate connection with

- steam pipeline
- electricity mains
- water mains
- sewage network.

The remaining 4 lots were found unsuitable, mainly because of complications with the connexions with energy sources or of a too great distance from the raw material basis, or because in one of the alternative lots several older buildings would have to be demolished.

The general conception of the building lot selection was elaborated and consulted with participation of the Office of the Chief Architect of the City of Ulan Bator. The experts and the Chief Architect reached principal agreement in the lot selection, and the Office handed over the necessary maps and plans to the experts.

The selected building lot is plane, its subsoil consists of compact gravel sand. In the western direction it neighbours on a new heating plant No. 4 under construction. On the northern side connections are possible with the city communication, steam pipeline, and electricity main. The southern part of the lot offers connections with a railroad siding and with the city water main. The eastern side is reserved for extension of other industrial plants. The Mongolian party was advised to carry out without delay hydrogeological exploration, planimetric and altimetric measurements, inclusive of fixing the supply and sewage networks for intended connections. From the infrastructural aspect the selected lot is well provided for. It is practically a part of well-equipped city with mass transportation facilities, and with developing housing facilities and social security. Infrastructural costs, at least in connection with the projected pilot plant, are not envisaged. The socio-economical environment is in agreement with the expected development and controlled by several planning systems. Private interests in the lot are nonexistent; the lot's proprietor is the state. This chapter is complemented by schemes of the whole state territory /Fig. I/ with demarcation of the locality concerned, and of the topographical situation in the city proper /Fig.II/.

LOCAL CONDITIONS

The climate is of the mountain type. Ulan Bator has an altitude about 1 300 m above the sea level. Accordingly, the air temperatures range from +35 °C to -40 °C. The winter season practically preponderates during 2/3 of the year. The atmospheric relative humidity averages 50 to 60 per cent; these minor values are determined by the rain- and snowfall values in the given territory, amounting to 300 mm/year. It is mainly a minor snowfall. Extreme rain- or snowfall is rare and does not occur currently. Western wind flow preponderates. Maximum wind velocity of 80--90 km/h is exceptional. Owing to the terrain structure in Mongolia, dust-laden winds occur. The spring thaw raises the river level in Ulan Bator to a maximum. The city is protected against the high water by an earth dam system. Earthquake forces reach maximally 3--4 degrees, Richter scale.

ESTIMATE OF INVESTMENT COST : LAND

ESTIMATE OF INVESTMENT COST : LAND

LAND

			ITEM DESCRIPTION		UNIT COST	COST		
						FOREIGN	LOCAL	TOTAL
			THE INVESTMENTS ARE PLANNED AND ORGANIZED BY THE GOVERNMENT OF MONGOLIA. THE SITE IS STATE PROPERTY, THEREFORE IT IS WITHOUT CHARGE.					

/INSERT TOTAL IN SCHEDULE 10-1/1

SCHEDULE 5-2

ESTIMATE OF PRODUCTION COST : LAND

ESTIMATE OF PRODUCTION COST

LAND

			ITEM DESCRIPTION		UNIT COST	COST FOREIGN	COST LOCAL	COST TOTAL
			THE INVESTMENTS ARE PLANNED AND ORGANIZED BY THE GOVERNMENT OF MONGOLIA. THE SITE IS STATE PROPERTY, THEREFORE IT IS WITHOUT CHARGE.					

/INSERT TOTAL IN SCHEDULE 7/

11250
(2 of 3)

CHAPTER VI. PROJECT ENGINEERING

CONTENTS :

PROJECT LAYOUTS

The pilot plant for the future biochemical integrated works is designed with a view to comply with the requirements of

- the production plan
- the material supply plan
- the technological processes proposed
- the optimal technological equipment, which should have an universal character
- the local conditions
- the building process
- the production programmes envisaged in the future

The whole complex of these aspects is taken into account in the layout plan, considering the entire pilot plant as a self-contained entity. It is presumed that the pilot plant will be realized in advance, and therefore the following separate services and facilities are planned for it:

- raw material supply
- storage service
- energy supply
- water supply
- social premises
- quality control laboratories
- administration service

The machinery and technological equipment proper is of a fairly universal character and expedient for the proposed production programme. The planned pilot plant in fact is a link between the research and the production. This idea is also inherent in the prospective master plan, whose draft outline is documented in the present report, too, although its elaboration had not been imposed to the expert group.

The layout plan of the pilot plant is actually governed by the characters of its parts, namely,

- biochemical production
- pharmaceutical manufacture
- quality control laboratories.

The general design presumes that the biochemical part will be provided with machinery and equipment with preponderantly downward-motion /gravity/ flow.

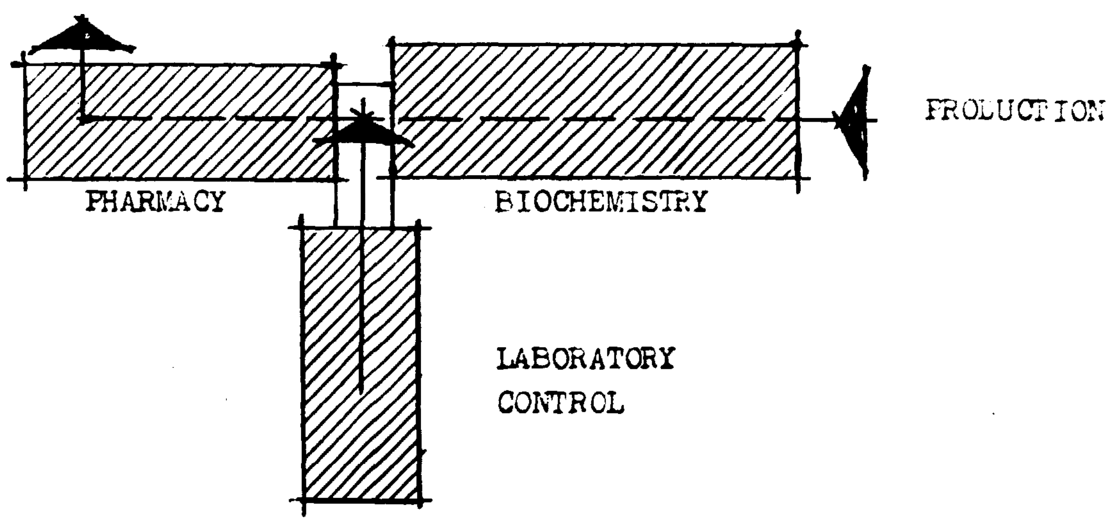
The biochemical section also will represent the entry for solid and liquid raw materials, and the entrance and exit centre of energies. In this section the final product is a substance, which either is a marketable final product or is sent to the pharmaceutical section for further processing. In the pharmaceutical section the substances produced in the biochemical section are processed to sterile substances or compressed to tablets, and these products are filled into containers and packaged. In the pharmaceutical part the storage services serve the needs of the dispensing form production; mainly packaging materials and constituents are stored here.

The forwarding department is the terminus of the products.

To ensure good manufacturing practice at both production sections and the required quality of the final products, the quality control unit must operate. This unit provides complete laboratory services. By acceptance, in-process, and final controls it ensures that the final products meet the pharmacopoeial specifications.

In the laboratory section suitable rooms are provided for the administration, central social premises, and maintenance.

From the following scheme it is evident that the several sections have separate premises serving their specific operations, but all three sections are integrated to a functional unit with mutual interconnexions.



The horizontal interconnexion of all three sections is given by the uniform line of floors. The vertical interconnexion is ensured by suitably localized lifts /hoists/ and staircases. The overall layout documents are enclosed in a separate back envelope at the end of the present report.

The main technological premise B-109--Biochemical pilot plant is a three-floor building with the ground dimensions 55m x 16m. At the ± 0 level there are localized the storerooms, cooled stores, energy machine rooms, transformer room 35/0,4 kV, cooling engine rooms, pump station for the solvent store, and freezing rooms for raw material.

The floor + 4,20 as well as the floor + 9,00 are adapted for biochemical operations, mainly in the form of halls. These technological operation rooms are complemented with cooling boxes, air conditioning station, auxiliary storeroom, and water demineralization plant.

The premise B-110 Pharmaceutical pilot plant, with the ground dimensions 43m x 13m, is a two-floor building. At the ± 0 level there are localized the storerooms for packaging material, glassware, chemicals, intermediate products, and final products. The forwarding department also is an integral part.

The B-111 Laboratory part is a multipurpose three-floor building with the ground dimensions 43m x 16m. The ± 0 level houses central social premises for men and for women, maintenance shops, storerooms for small materials, and the neutralization plant, which will liquidate chemical waste waters from both the biochemical section and the laboratories.

The floor + 4.20 contains quality control laboratories, ensuring the clearance of products from the biochemical section either to the store of final products or to further processing in the pharmaceutical section, and from the pharmaceutical section to the store of final products. Complementary components to the laboratories are certain operation rooms at the + 8.40 floor, where the remaining rooms serve various other purposes: offices of the pilot plant head and the laboratory head, studies, library, and administration rooms.

Provisionally also a small canteen with a kitchen are localized there; they will be vacated after construction of a works canteen facility.

SCOPE OF PROJECT

The general conception of the project follows constantly the principal idea outlined in the "MANUAL FOR THE PREPARATION OF INDUSTRIAL FEASIBILITY STUDIES" /1978/. For this reason, and with the aim at the maximal complexity of the solution with the intention to obtain correct estimations of the investment costs, the study is divided into several parts, as follows.

The engineering and technological part is divided into the following premises:

A - 01 Production of peptone
A - 02 Production of pepsin
A - 03 Production of trypsin
chymotrypsin
pancypsin
A - 04 Production of cholesterol
A - 05 Production of pancreatin
A - 06 Production of blood hydrolysate
A - 07 Production of dried bile
A - 08 Manufacture of tablets
A - 09 Manufacture of sterile substances
A - 10 Quality Control Laboratory
A - 11 Solvent recovery plant
A - 12 Water deminèralization plant
A - 13 Engine room for steam, condensate, and hot water production

A - 14 Neutralization plant

A - 15 Store for inflammable solvents

A - 16 Central pressure air production

A - 17 Cooling plant

A - 18 Transformer station 35/0.4 kV

A - 19 Air conditioning station

A - 20 Maintenance shops

A - 21 In-process transportation

Building part

B - 101 Preparation of the land for buildings

B - 102 Outside connections of electricity 35/0. 4kV

B - 103 Outside connections of water supply

B - 104 Outside connections of low voltage electricity

B - 105 Outside connections of steam /pipe lines/

B - 106 Outside connections to city sewerage

B - 107 Roadways

B - 108 Store for liquid material

B - 109 Biochemical pilot plant

B - 110 Pharmaceutical pilot plant

B - 111 Quality control and social premises.

Documentation completely elucidating the expert group's designs

Fig. I	Central Asian area with outline of Mongolia and localization of Ulan Bator /1 : 15 000 000/
Fig. II	Detail of localization of Ulan Bator with outline of site provided for biochemical integrated works /1 : 10 000/
Fig. III	Scheme of general plan of site coverage and localization of pilot plant /1 : 1 000/
Fig. IV	Pilot plant - ground floor ± 0
Fig. V	Pilot plant - floor + 4.20m
Fig. VI	Pilot plant - floor + 8.40m /9.00m/
Fig. VII	Sectional view I-I′
Fig. VIII	Sectional view II-II′

The documents Fig. I - VIII are contained in attached back envelope.

The documents Fig.IX - XVII are inserted in the part VI - - TECHNOLOGY in the appropriate places, as follows.

Fig. IX	block chart,	A - 01	Production of peptone
Fig. X	block chart,	A - 02	Production of pepsin
Fig. XI	block chart,	A - 03	Production of trypsin chymotrypsin pancypsin
Fig. XII	block chart,	A - 04	Production of cholesterol
Fig. XIII	block chart,	A - 05	Production of pancreatin
Fig. XIV	block chart,	A - 06	Production of blood hydrolysate
Fig. XV	block chart,	A - 07	Production of dried bile
Fig. XVI	block chart,	A - 08	Manufacture of tablets
Fig. XVII	block chart,	A - 09	Manufacture of sterile sub-stances
Fig. XVIII	flow chart,	A - 01	Production of peptone
Fig. XIX	flow chart,	A - 02	Production of pepsin
Fig. XX	flow chart,	A - 03	Production of trypsin chymotrypsin pancypsin
Fig. XXI	flow chart,	A - 04	Production of cholesterol
Fig. XXII	flow chart,	A - 05	Production of pancreatin
Fig. XXIII	flow chart,	A - 06	Production of blood hydrolysate
Fig. XXIV	flow sheet	A - 07	Production of dried bile
Fig. XXV	flow sheet	A - 11	Solvent recovery plant

The documents Fig. XVIII - XXX are contained in attached back envelope.

TECHNOLOGY /IES/

A - 01 Production of peptone

In the reservoir 8, calcium hydroxide solution /lime milk/ is prepared. The raw material /paunch and ventricle/ is minced in the mincing machine 10 and transferred into the reactor 1 a-d. The presumed charge size is 300 kg into one jacketed kettle. Previously minced activated pancreas is added to the raw material, and the mixture is stirred for about 7 hours, with occasional additions of lime milk. Then the acidity of the mixture is adjusted with phosphoric acid, and the solid fraction is separated in the centrifuge 2 a/b/. The waste pulp is usable in the [illegible]ture as fertilizer. The filtrate is collected in the reservoirs 3 a/b/, from which it is pumped into the film evaporator 4, where it is concentrated to 1/20 of the original volume. This liquid is collected in the jacketed kettle 5 a/b/, in which it is diluted with an equal volume of demineralized water. This solution is filtered through the plate filter 6 into the reservoir 9. From this reservoir it is pumped into the spray drier 7, which yields 141 kg of product per day.

For export purposes the product must comply with quality demands of the United States Pharmacopeia XX /USP XX/, National Formulary XV.

The basic in-process controls: the solution before drying must have pH 5,5-6,5 and must be clear.

FIG. IX

A - 01 PRODUCTION OF PEPTONE

Max. Energy Input/H	
Steam	0.48 T/H
Electricity	56 kW/H
Cooling water	8 m^3/H

Raw material / shift	/8shifts per day/
Paunch and Ventricles	0.5 T
H_3PO_4	11 L
$Ca(OH)_2$	17.6 L

Input / Output	Step	Input / Output
	1 GRINDING	Paunch + Ventricles 0.5 T
	2 HYDROLISATION	Pancreas 0.0015 T H_3PO_4 11 L Water 0.3 m^3 $Ca(OH)_2$ 17.6 L
Waste 350 L	3 CENTRIFUGATION	
	600 L	
Vapor 350 L	4 EVAPORATION	
	250 L	
	5 DILUTION	Demi water 250 L
	500 L	
	6 FILTRATION	
	7 SPRAY DRYING	0.01765 T/shift 0.141 T/day 32 T/year

Wastes/day

Solid	0.35 T
Water	350 L

A - 02 Production of pepsin

100 kg of raw material /hog gastric mucosa or ox tripe/ is minced in the mincing machine 1 and transferred into the autolyzation kettle 2a - 2c. Hydrochloric acid is added and the mixture is autolyzed for 48 hours at 40 °C. The kettle jacket is heated with hot water heated in the boiler 9 and circulated with the aid of a pump. The autolyzed kettle content is let out through the sieve 4 a /b/ into the reservoir 5 a /b/, in which the product is purified and precipitated. With respect to the sort of the product, ethanol or sodium chloride serve as precipitants. The precipitate is collected on the vacuum filter 6 and dried on trays in the drier 7. Ethanol is recuperated for repeated use /equipment A-11/.

The dried product is pulverized in the grinder 9 and put through the sieving machine 8.

About 2,-kg of medicinal pepsin, or 5,-kg of industrial pepsin is produced from 100,-kg of raw material.

For export purposes the medicinal pepsin must fall in quality demands of Food Chemical Codex /FCC/ - USA, with proteolytic activity 3000-3.500 USP units.

A-02 PRODUCTION OF PEPSIN

1. Medicinal
2. Industrial

Max. Energy Input/H

Steam	0.05 T/H
Electricity	10 kWH
Cooling water	0.5 m^3/H

Raw material shift/day

Mucous membrane	0.1 T
HCl	3.6 L
C_2H_5OH 96%	700 L

1 GRINDING — Mucous Membrane 0.1 T

2 AUTOLYSIS — HCl 3.6 L; Water 100 L

3 SEPARATION ON SIEVES — Waste 0.01 T

4 PRECIPITATION — C_2H_5OH 96% 680 L; Waste 0.005 T

5 FILTRATION — C_2H_5OH 20 L; C_2H_5OH 86% to regeneration 800 L

0.01 T /0.04 T/

6 DRYING

0.002 T /0.005 T/

7 GRINDING

0.002 T /0.005 T/

8 SIEVING

Pepsin for medicinal purposes 0.104 T/year
52 shifts/year

Pepsin for industrial purposes 1 T/year
200 shifts/year

Wastes/day

Solid 0.015 T

A - 03 Production of trypsin, chymotrypsin, and pancypsin

The basic raw material for all three products to be manufactured in the proposed equipment is either beef or mutton pancreas. A charge of 100 kg pancreas is minced in the mincing machine 1 and transferred into the extraction kettle 2. Extraction with water acidified with sulphuric acid proceeds at ordinary temperature /25 °C/ for about 7 hours. After its completion the mixture is put through the sieve 3, and the pulp retained on the sieve is pressed out in the press 4. The extract is collected in the reservoir 5, and the product is salted out with ammonium sulphate. The precipitate is collected on the stainless-steel filters 6a, 6b. The acid filtrate is piped to the neutralization plant /A-14/, processed there, and piped into the sewage. The retained precipitate is purified on a laboratory scale in a laboratory provided with adequate equipment 7 and a refrigerator box 8.

From 100,-kg of pancreas 0,06 kg of Trypsin and 0,1 kg of Chymotrypsin, or 0,25 kg of Pancypsin is obtained.

For export purposes the products must comply with demands of United States Pharmacopeia XX. The products must have the following proteolytic activity units: Trypsin 2.500 USP units, Chymotrypsin 1.000 USP units and Pancypsin 250 USP units. The products must pass the microbial limit tests.

Necessary in-process controls: The product before lyophilization must show the residue on ingotion max. 2,5%.

A-03 PRODUCTION OF CHYMOTRYPSIN
TRYPSIN
PANCYPSIN

Max. Energy Input/H

Electricity	8 kWH
Cooling water	0.2 m^3/H

Raw material/shift /2shifts/day/

Pancreas	0.1 T
H_2SO_4	0.019 T
$(NH_4)_2SO_4$	0.16 T
Kieselgur	0.01 T
HCl	0.0058 T
NaCl	0.002 T

1 GRINDING — Pancreas 0.1 T

2 EXTRACTION — H_2SO_4 0.0019 T

0.0519 T

Waste 0.05 T — 3 SEPARATION ON SIEVES AND PRESS

0.0519 T

4 SALTING — $(NH_4)_2SO_4$ 0.16 T

100 L

Liquid sink 100 L pH 2-3 — 5 FILTRATION — Kieselgur 0.01 T

6 LABORATORY PURIFICATION — HCl 0.0058 T; NaCl 0.002 T

7 REFRIGERATOR BOX

Chymotrypsin	0.02 T/year
Trypsin	0.012 T/year
Pancypsin	0.0875 T/year

Waste

Solid	0.05 T
Liquid sink	100 L

A - C4 Production of cholesterol

For the production of cholesterol the basic raw material, beef spine cord, must be first dried. The raw material is minced in the mincing machine 1 and dried on trays in the shelf drier 2. The dried raw material /daily yield about 30 kg/ is stored in the in-process store, whence it is drawn for further processing.

15 kg of dried raw material is transferred to the extraction kettle 3 and extracted with acetone for about 3 hours with stirring and moderate cooling. The mixture is then put through the pressure filter 4. The extracted pulp is waste product. The filtrate is collected in the reservoir 5, from which it is pumped /pump 20/ into the film evaporator 6. The concentrated solution is collected in the kettle 9 and evaporated there to dryness. The intermediate product, pooled from 6 primary operations, is extracted in the kettle 13 with ethanol, with sulphuric acid added, at the boiling point of the extractant mixture, under the reflux cooler 14. The hot extract is put through the monocell filter 15 and collected in the kettle 16, in which crystallization proceeds under water cooling. The product is recrystallized once in the same equipment. The final product is collected on the suction filter 17 and dried in the vacuum shelf drier 18. The dried product is sieved.

From 100,- kg of fresh spinal cord about 3,9 kg of cholesterol is produced.

For export purposes the final product must comply with quality demands of the USP XX., page 148.

In-process controls: The product after recrystallization must show the melting point 147-150 °C and specific rotation -34° to -38°. If this values are not achieved the product must be recrystallized.

The ethanol and acetone used in the operations are regenerated at the plant A-11.

A-04 PRODUCTION OF CHOLESTEROL

Max. Energy Input	
Steam	0.1 T/H
Electricity	6 kWH

Raw material/shift /2 shifts/day/	
Spinal cord	0.05 T
CH_3COCH_3	350 L
C_2H_5OH	25 L
H_2SO_4	0.55 L

1 GRINDING — Spinal cord 0.05 T

0.05 T

2 DRYING

0.015 T

3 STORE

0.015 T

4 EXTRACTION — CH_2COCH_3 350 L

350 L

Waste 0.01 T — 5 FILTRATION

350 L

CH_3COCH_2 ~350 L for regeneration — 6 /1/ EVAPORATION

7 /2/ EVAPORATION

0.005 T

8 STORE

0.025 T raw mat.

9 EXTRACTION FROM 6 SHIFTS — H_2SO_4 3.3 L /6 shifts; C_2H_5OH 75 L /6 shifts

~ 90 L

Waste 0.01 T — 10 FILTRATION

11 CRYSTALLIZATION

C_2H_5OH ~150 L for regeneration — 12 FILTRATION — C_2H_5OH 75 1/6 shifts

13 DRYING

14 SIEVING — Cholesterol 0.0116 T/3days

Waste

Solid 0.02 T

A - 05 Production of pancreatin

100,- kg of pancreas is minced in the mincing machine 1 and transferred into the extraction kettle 2, where it is extracted with water for 3 hours at 20 °C. Then the mixture is let out through the sieve 3 and the extract is collected in the reservoir 4 a /b/. The pulp retained on the sieve is usable as foodstuff. From the collected extract pancreatin is precipitated with acetone. The precipitate is collected on the suction filter 5. The wet product is transferred into the kettle 6, slurried with acetone, and collected again on the suction filter 5. The acetone is sent for regeneration to A-11. The final product is dried completely on trays in the shelf drier 7, and 10,- kg of final product is obtained.

Pancreatin for medical purposes must comply with demands of USP XX /page 580/.

The in-process control: Before final grinding the content of fat max. 3%.

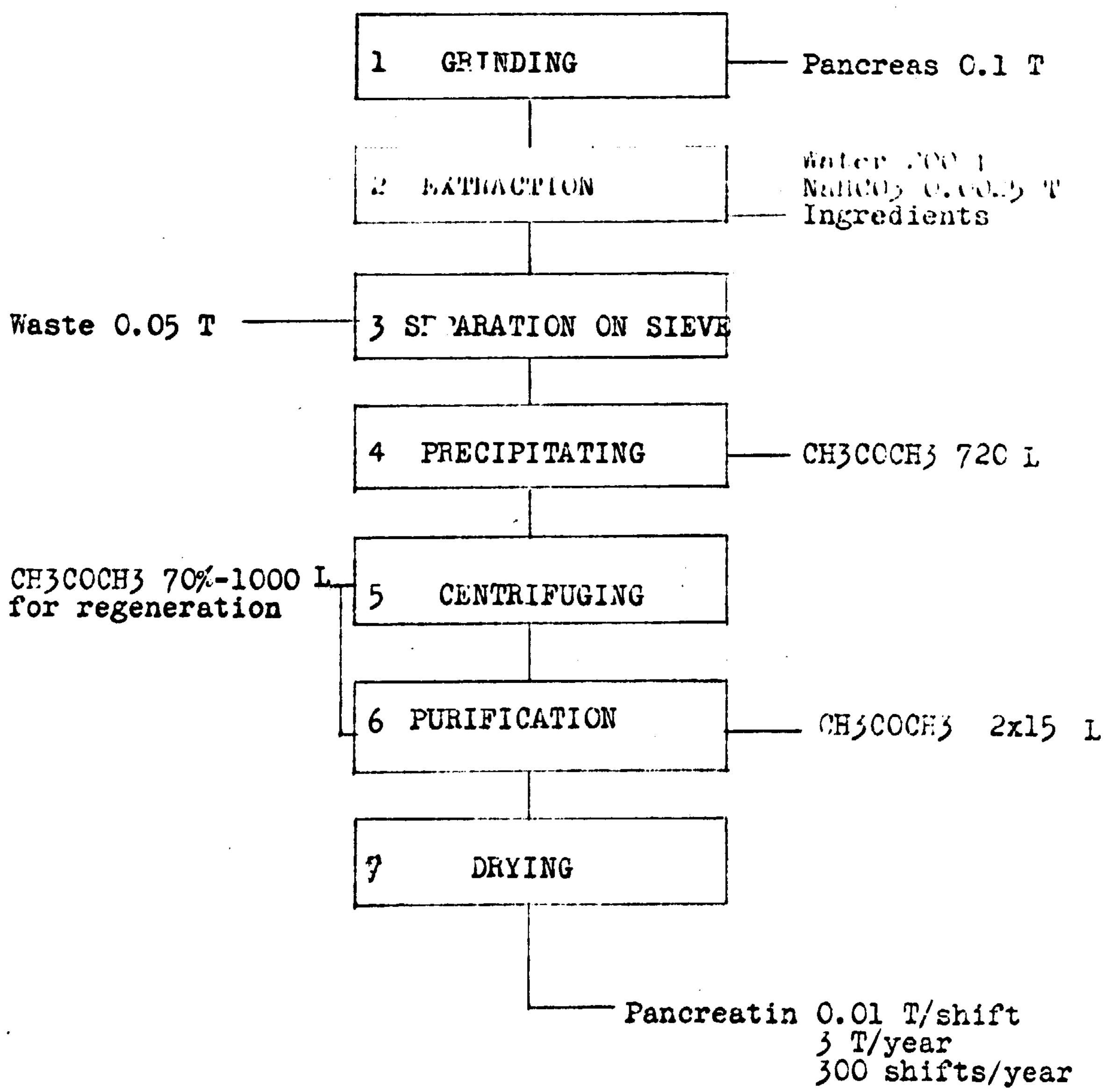
A-05 PRODUCTION OF PANCREATIN

Max Energy Input/H

Steam	0.06 T/H
Electricity	13 kWH

Raw material/shift /2shifts/day/

Pancreas	0.1 T
$NaHCO_3$	0.0025 T
CH_3COCH_3	750 L



Waste

Solid 0.05 T

A - 06 Production of blood hydrolysate

The basic raw material is beef blood. 175 liters blood is transferred into the kettle 1, sulphuric acid is added, and hydrolysis proceeds at 120 °C and the pressure corresponding to the temperature. The hydrolytic process takes 3 hours. Then the mixture is cooled, neutralized with lime milk in the reservoir 2, and filtered through the suction filter 2 into the reservoir 4 provided with a stirrer. Oxalic acid is added, and the supernatant is pumped into the film evaporator 5. The thickened liquid is filtered on a laboratory--scale equipment. The yield of thickened liquid is about 15 liters per day. After filtration it is dried in the spray drier 9. Before drying the filtrate can be stored in a freezing box, which is a part of the laboratory equipment.

16,2 kg of blood hydrolysate is produced daily in 2 shifts.

A - 06 PRODUCTION OF BLOOD HYDROLYSATE

Max. Energy Input/H

Steam	0.14 T/H
Electricity	10.5 KWH
Cooling water	1.2 m^3/H

Raw material/shift /2 shifts/day/

Blood	175 L
H_2SO_4	3.5 L
$Ca(OH)_2$	0.006 T
Oxalic Acid	0.00015 T

1 HYDROLYSIS — Blood 175 L; H_2SO_4 3.5 L; Water 175 L; $Ca(OH)_2$ 0.0006 T

2 FILTRATION — Waste 0.01 T $CaSO_4$

350 L

3 EVAPORATION — Oxalic Acid

4 LABORATORY

5 SPRAY DRYING

Blood Hydrolysate 0.0081 T/shift
0.0162 T/day
1.88 T/year

Waste

Solid	0.01 T/shift
Water	320 L/shift

A - 07 Production of dried bile

Owing to the season-conditioned campaign character of the work in the slaughterhouse integrated works, all bile collected must be first thickened to about 1/5 of its original volume, and the thickened intermediate product stored in a freezing box for further yearly processing. 500 kg bile is strained and collected in the reservoir 1; from the reservoir the bile is pumped into the film evaporator 2, where it is thickened to 1/5 of its original volume. The thickened intermediate product can be either stored in a freezing box or directly dried in the spray drier serving also the production of peptone.

From 500,- kg of fresh bile 52,- kg of the final product is obtained.

For export of dry bile for medical use the product must comply with demands of National Formulary XI. It must contain min. 40% of cholic acid, and must pass the microbial limit tests.

A-07 PRODUCTION OF DRIED BILE

Max. Energy Input

Steam 0.07 T/H
Electricity 1.7 kWH
Cooling water 1 m^3/H

Raw material/shift

Bile 0.5 T

1 SEPARATION ON SIEVE — Bile 500 L

2 EVAPORATION

3 TO COOLED STORE

4 SPRAY DRYING

Dried bile 0.032 T/shift
1 shift/day
3.9 T/122 days

Waste

Liquid 400 L

A - C8 Manufacture of tablets

The substances produced in the pilot plant will be processed to the tablet form as follows. The substance is moistened and kneaded in the kettle 1 together with the necessary constituents; the mixture is put through the sieve 2 and dried on stainless-steel trays in the dryer 3. The dried mixture is sieved again and pressed to tablets with the tabletting machine 4. In some instances the tablets will be film-coated in the film-coating machine 5. The tablets will be filled into containers with the filling machine 6. Labelling and putting into cartons are assumed to be performed manually.

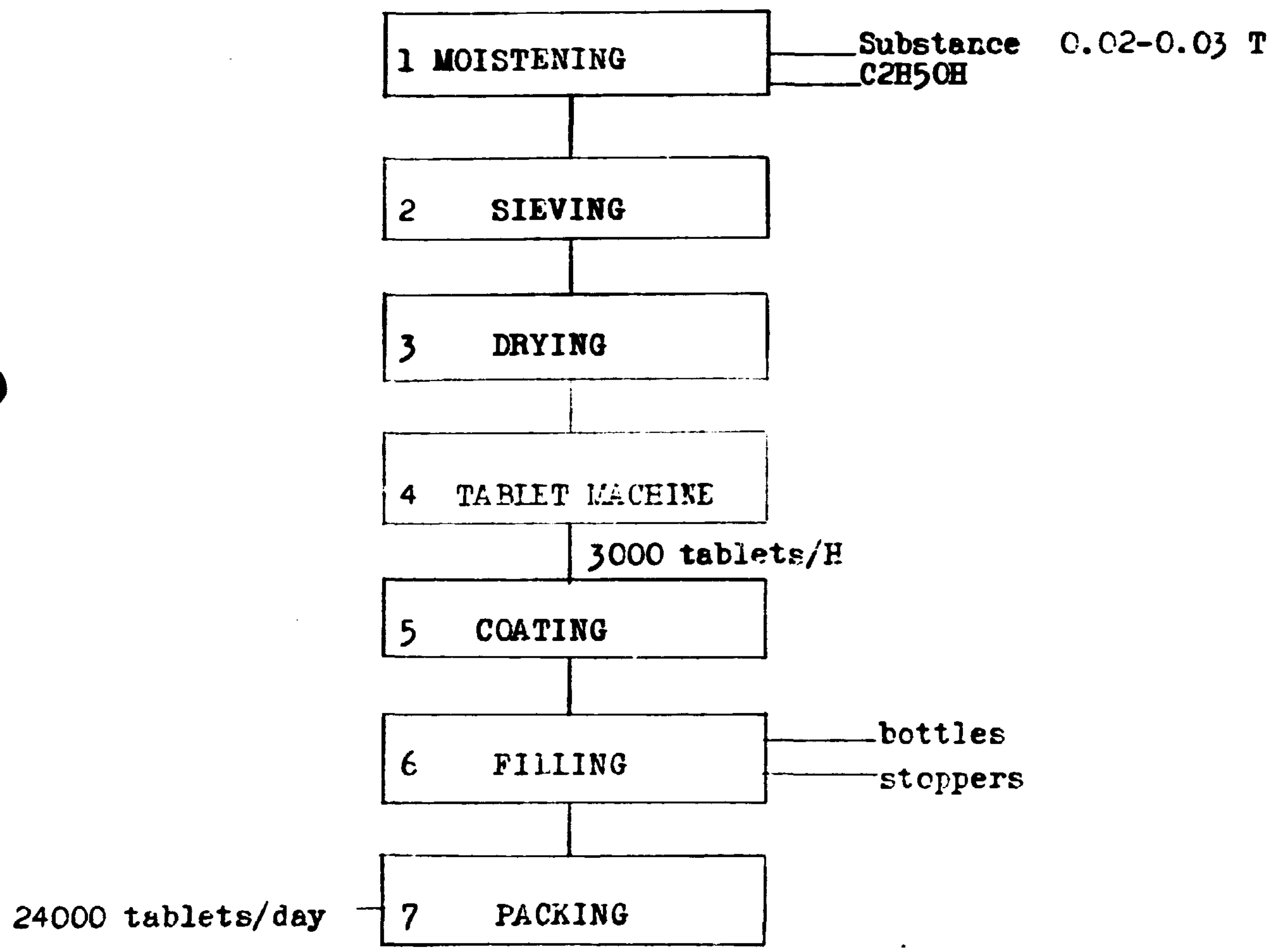
A-08 MANUFACTURE OF TABLETS

Max. Energy Input/H

Electricity 3 kWH

Raw material/day

Substance 0.02 - 0.03 T



A - 09 Manufacture of sterile substances

Some of the products prepared in the chemical departments of the pilot plant will be processed to sterile preparations in the pharmaceutical department.

The substance is dissolved in the kettle . The solution is sterilized by filtration through the Seitz filter . The sterile solution is then filled under sterile conditions with the filling machine , fed with vials and closures presterilized in the double-door autoclave . Filled vials with crimped closures are labelled and packaged in the appropriate rooms of the pharmaceutical department.

In other instances the sterile solution is filled manually into 100-ml bottles, shell-frozen in the shell-freezing apparatus , and freeze-dried in the existing Leybold plant. For this freeze-drying a reconstruction of the existing freeze-drying plant is envisaged.

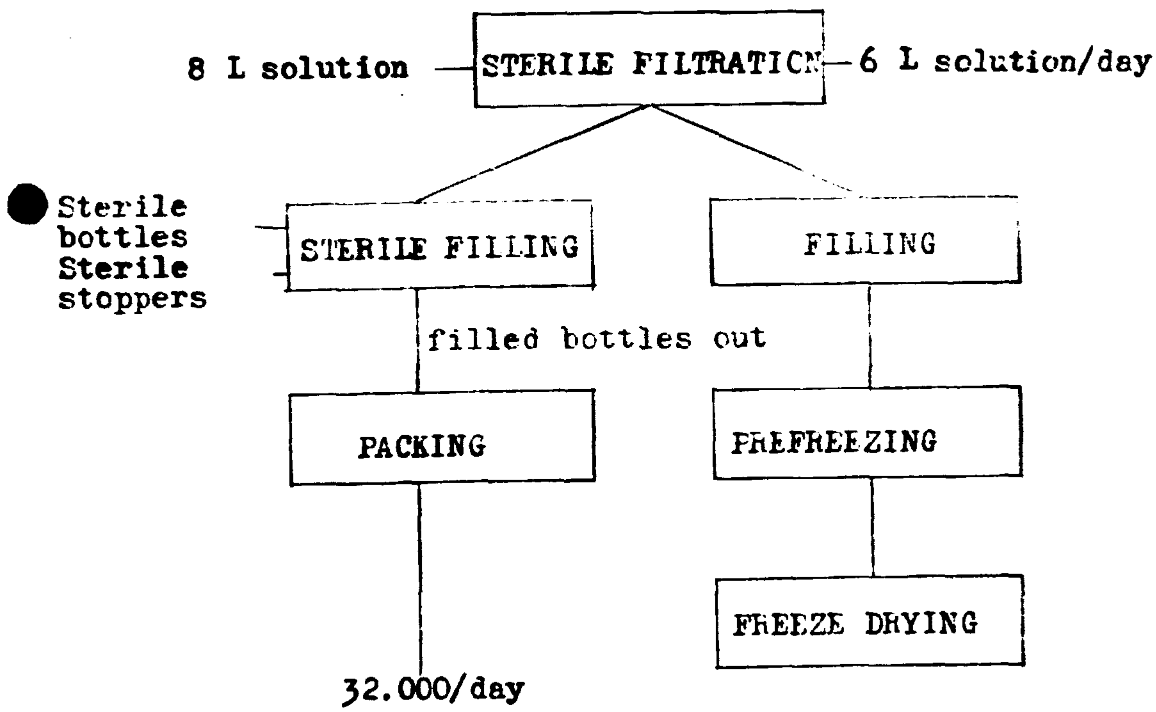
FIG. XVII

A-09 MANUFACTURE OF STERILE SUBSTANCES

Max. Energy Input/H

Raw material

Electricity	13 kWH
Steam	0.05 T



A - 10 Laboratory quality control unit

This unit is intended to provide the laboratory in-process control, firstly, for a part of the production of chemical substances and, secondly, for a part of the pharmaceutical manufacture; and in general, all phases of the technical quality control. To ensure these requirements, use will be made of the existing equipment owned by the laboratories of the Research Institute of the slaughterhouse integrated works in Ulan Bator, which equipment will be moved into the new premises in the pilot-plant building, and new complementary equipment will be provided. The new equipment is specified in the list A-10.

A - 11 Regeneration of ethanol and acetone

For economization of the pilot-plant operation, regeneration of solvents, especially of ethanol and acetone, is envisaged, ie, of solvents used in the technolcgical processes specified before. The capacities of the equipment have been chosen so that the regeneration can be completed during one, maximally two, working shifts. In this way a reserve capacity is available in case of any changes in the production programme. Such changes can be expected in view of the universal character of the proposed pilot plant.

The solvent regeneration plant is technologically connected with the operation unit A-15 Inflammable solvent store, where both the solvents waiting for regeneration and the regenerated solvents are collected.

From the inflammable solvent store the ethanol mixture to be regenerated is pumped to the continuously operating rectification plate column 2, and the acetone mixture to be regenerated to the rectification packed column 5. The solvents to be regenerated are pumped into the feeding reservoirs 1 and 4a. The purified solvents are collected in the reservoirs 3 and 4b and piped back to pure solvent reservoirs placed in the inflammable solvent store. The capacities of the rectification columns are about 200 - 250 liters of regenerated solvent per hour.

A - 12 Preparation of demineralized and of pyrogen-free water

This operation unit ensures the production of demineralized and of pyrogen-free water for the needs of both the pilot-plant laboratories and the production processes.

For the preparation of demineralized water, a standard automatic glass plant 1 is envisaged, with cyclic regeneration of the filling. Its capacity is 200 liters of demineralized water per hour. Demineralized water will be distributed to the consumption sites by gravity.

Pyrogen-free water is distilled from demineralized water pumped by the pump 3 into the jacketed kettle 4. The water vapours escaping from the boiling water are liberated from possible carryover water droplets by their re-overheating in the condenser 5, provided with indirect high-pressure steam heating. Condensed and cooled pyrogen-free water will be collected in the reservoir 7 and distributed to the consumption sites by gravity.

A - 13 Steam and condensate station

This operation unit provides the pressure reduction of steam, piped from an external source, down to the pressure used in the production operations at the pilot plant. Simultaneously, with the aid of the countercurrent heat exchanger 2 the unit ensures the production of hot water for operational and hygienic purposes. Water heated to 55 °C will be collected in the reservoir 3 and piped from it to the consumption sites. The entire hot-water production process will be controlled automatically.

In the reservoir 1 the condensate will be collected from the production premises and from the heating system of the pilot plant.premises, and automatically pumped with the pump 4 back to the heat exchanger.

A - 14 Neutralization plant

This plant ensures the neutralization of waste waters from the production and laboratories before their outflow into the sewage system. The whole plant operates automatically. The waste waters flow into the reservoir 1, where their mutual preneutralization proceeds. Then the waters overflow into the reservoir 1b. The contents of both reservoirs are continuously stirred vigorously. With the aid of the pump 4 the waste water in the reservoir 1b is circulated. At the outlet of the pump a pH-meter sensor is placed; the pH-meter governs the dosage of either sulphuric acid from the reservoir 2 or lime milk from the reservoir 3. When the final pH value ranges between 6 and 8, the neutralized waste water is let off into the sewage system. No further purification of this waste water at the pilot plant is envisaged.

A - 15 Inflammable solvent store

The store ensures the storage of used solvents, ie, ethanol and acetone, in the storage tanks 1a, 1c; and the storage of regenerated or fresh ethanol and acetone in the storage tanks 1b,d,e. It ensures the supply of ethanol and acetone to the production premises. Installation of volume meters is envisaged, which will ensure a balance of the received and supplied quantities of the solvents.

The storage is localized underground and the storage tanks are covered with earth, and thus the unit meets the safety regulations for the storage of Ist-class inflammables.

A - 16 Vacuum and pressure-air central station

For providing central vacuum for the production premises and laboratories, two wet air pumps with circulation tanks 3a, 3b will be installed.

For production of pressure air for the operation, transportation, measuring, and regulation, two compressors 1a, 1b, with a pressure tank 2, and a silica-gel drying unit 3 will be installed.

A - 17 Cooling plant

A - 18 Transformer station 35/0,4 kV

A - 19 Air conditioning station

A - 20 Maintenance shops

A - 21 In-process transportation

EQUIPMENT

SCHEDULE 6-2/1

ESTIMATE OF INVESTMENT COST : EQUIPMENT

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-01 DESCRIPTION -PRODUCTION OF PEPTONE

	PIECES		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
1	4		REACTOR, 1000 L, ENAMELLED		6000,-	24 000,-		81 120,-
2	2		CENTRIFUGE, DIAM. 1000mm, AKV STEEL		6800,-	13 600,-		45 970,-
3	2		RESERVOIR, 1000 L		4500,-	9 000,-		30 420,-
4	1		FILM EVAPORATOR, 350L/H, AKV STEEL		17400,-	17 400,-		58 810,-
5	2		KETTLE-JACKETED, 630L, ENAMELLED		5700,-	11 400,-		38 530,-
6	1		PLATE FILTER		1200,-	1 200,-		4 060,-
7	1		SPRAY DRIER, 30L/H, AKV STEEL		133200,-	133 200,-		450 210,-
8	2		RESERVOIR, 630L, STEEL		450,-	900,-		3 040,-
9	1		MEAT MINCING MACHINE		4500,-	4 500,-		15 210,-
10	1		RESERVOIR, 300L, AKV STEEL		2400,-	2 400,-		8 110,-
11	2		PUMPS		250,-	500,-		1 690,-
12			PIPING AND FITTINGS			11 300,-		38 190,-
13			ELECTRICITY WIRING-COMMERCIAL SUPPLY			2 300,-		7 770,-
14			MEASURING AND REGULATION - COMMERCIAL SUPPLY			1 500,-		5 070,-
				TOTAL		233.200,-		788.200,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO ...

SCHEDULE 6-2/2
ESTIMATE OF INVESTMENT COST : EQUIPMENT

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-02 DESCRIPTION - PRODUCTION OF PEPSIN

	PIECES		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US$ Dollars	COST LOCAL Tg	COST TOTAL Tg
1	1		MEAT MINCING MACHINE		2300,-	2 300,-		7 770,-
2	3		KETTLE-JACKETED, 300L, ENAMELLED		4000,-	12 000,-		40 560,-
3	1		MEASURING VESSEL, STEEL		200,-	200,-		680,-
4	2		SIEVE		200,-	400,-		1 350,-
5	2		RESERVOIR, 1000L, ENAMELLED		450,-	900,-		3 040,-
6	1		VAKUUM FILTER, DIAM. 600mm, ENAMELLED		4100,-	4 100,-		13 860,-
7	1		TRAY DRIER		10600,-	10 600,-		35 830,-
8	1		SIEVING MACHINE		4900,-	4 900,-		16 560,-
9	1		BOILER		800,-	800,-		2 700,-
10			PIPING AND FITTINGS			4 900,-		16 560,-
11			ELECTRICITY WIRING - COMMERCIAL SUPPLY			1 500,-		5 070,-
12			MEASURING AND REGULATION-COMMERCIAL SUPPLY			800,-		2 700,-
			TOTAL			43.400,-		146.680,-

CARRY OVER TOTAL OF PROJECT [illegible]

[illegible] 6-3

[illegible]

[illegible] No.A-03 [illegible]

	[illegible]		ITEM DESCRIPTION		[illegible] COST	COST FOREIGN US Dollars	TOTAL Tg	Tg
1	2		KETTLE, JACKETED, 500L, ENAMELLED		6300,-	12 600,-		42 590,-
2	1		SIEVE		200,-	200,-		680,-
3	1		[illegible]		[illegible],-	[illegible],-		[illegible],-
[illegible]	[illegible]		[illegible], [illegible]		[illegible]500,-	8 300,-		[illegible],-
5	4		VACUUM FILTER, [illegible] STEEL		1200,-	4 800,-		16 220,-
6	1		REFRIGERATOR BOX		4500,-	4 500,-		15 210,-
7			PIPING AND FITTINGS			[illegible] 500,-		7 [illegible]70,-
8			ELECTRICITY WIRING-COMMERCIAL SUPPLY			900,-		3 [illegible]40,-
9			MEASURING AND REGULATION-COMMERCIAL SUPPLY			400,-		1 [illegible],-
				TOTAL		34,200,-		115.590,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 6-3/

SCHEDULE 6-2/4

ESTIMATE OF INVESTMENT COST : EQUIPMENT

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-04 DESCRIPTION - PRODUCTION OF CHOLESTEROL

	PIECES		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
1	1		SHELF DRIER		10600,-	10 600,-		35 830,-
2	1		KETTLE, JACKETED, 500L, ENAMELLED		6300,-	6 300,-		21 290,-
3	1		PRESSURE FILTER, DIAM. 600mm, ENAMELLED		5300,-	5 300,-		17 910,-
4	1		RESERVOIR, 630L, AKV STEEL		4500,-	4 500,-		15 210,-
5	1		FILM EVAPORATOR, 120L/H AKV STEEL		15100,-	15 100,-		51 040,-
6	1		CONDENSER, $4m^2$, AKV STEEL		1800,-	1 800,-		6 080,-
7	2		RESERVOIR, 150L, AKV STEEL		1150,-	2 300,-		7 770,-
8	1		KETTLE, JACKETED, 100L, AKV STEEL		3600,-	3 600,-		12 170,-
9	1		COOLER, $1m^2$, AKV STEEL		800,-	800,-		2 700,-
10	1		RESERVOIR, 100L, GLASS		200,-	200,-		680,-
11	1		MEASURING VESSEL 200L AKV STEEL		1400,-	1 400,-		4 730,-
12	1		KETTLE, JACKETED, 160L, ENAMELLED		3900,-	3 900,-		13 180,-
13	1		MONOCELL FILTER, DIAM. 800mm, ENAMELLED		3000,-	3 000,-		10 140,-
14	1		KETTLE, JACKETED, 150L, ENAMELLED		4000,-	4 000,-		13 520,-
15	1		SUCTION FILTER, DIAM. 800mm, STONEWARE		200,-	200,-		680,-
16	1		VACUUM SHELF DRIER, 500L		10600,-	10 600,-		35 830,-
17	1		PUMPS		200,-	200,-		680,-
18			PIPING AND FITTINGS			7 600,-		25 690,-
19			ELECTRICITY WIRING - COMMERCIAL SUPPLY			1 500,-		5 070,-
20			MEASURING AND REGULATION COMMERCIAL SUPPLY			1 100,-		3 720,-
			TOTAL			84 000,-		283 920,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO [illegible]

ESTIMATE OF INVESTMENT COST : EQUIPMENT

ESTIMATE OF INVESTMENT COST

[illegible]

PROJECT COMPONENT No.A-05 DESCRIPTION-PRODUCTION OF [illegible]

	PIECES		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	LOCAL Tg	TOTAL Tg
1	1		MEAT MINCING MACHINE		2300,-	2 300,-		7 770,-
2	1		KETTLE, JACKETED, AKV STEEL		5700,-	5 700,-		19 270,-
3	1		SIEVE, AKV STEEL		200,-	200,-		680,-
4	2		RESERVOIR, 1000L, WITH STIRRER		1150,-	2 300,-		7 770,-
5	1		SUCTION FILTER		1100,-	1 100,-		3 720,-
6	1		KETTLE, 100L, WITH STIRRER		200,-	200,-		680,-
7	1		SHELF DRIER, 500L		10600,-	10 600,-		35 830,-
8			PIPING AND FITTINGS			6 100,-		20 620,-
9			ELECTRICITY WIRING - COMMERCIAL SUPPLY			1 100,-		3 720,-
10			MEASURING AND REGULATION-COMMERCIAL SUPPLY			200,-		680,-
			TOTAL			29.800,-		100.740,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 6-3/

ESTIMATE OF INVESTMENT COST : EQUIPMENT

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-06 DESCRIPTION- PRODUCTION OF BLOOD HYDROLYSATE

	PIECES		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
1	1		KETTLE, JACKETED, HOOL, WITH STIRRER, ENAMELLED		6300,-	6 300,-		21 290,-
2	1		SUCTION FILTER, DIAM. 600mm, AKV STEEL		900,-	900,-		3 040,-
3	1		MEASURING VESSEL, 50L, GLASS		100,-	100,-		340,-
4	1		RESERVOIR, 400ØL, WITH STIRRER, AKV STEEL		3800,-	3 800,-		12 840,-
5	1		FILM EVAPORATOR, 92L/H AKV STEEL		15100,-	15 100,-		51 040,-
6	1		COOLER, 2m2, AKV STEEL		1100,-	1 100,-		3 720,-
7	2		RESERVOIRS, 100L, GLASS		250,-	500,-		1 690,-
8	1		FREEZING BOX		6800,-	6 800,-		22 980,-
9	1		PUMP		200,-	200,-		680,-
10			PIPING AND FITTINGS			3 000,-		10 140,-
11			ELECTRICITY WIRING - COMMERCIAL SUPPLY			800,-		2 700,-
12			MEASURING AND REGULATION-COMMERCIAL SUPPLY			200,-		680,-
			TOTAL			38.800,-		131.140,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 6-3/

ESTIMATE OF INVESTMENT COST : EQUIPMENT

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-07 DESCRIPTION-PRODUCTION OF DRIED BILE

	PIECES		ITEM DESCRIPTION		UNIT COST	COST		
						FOREIGN US Dollars	LOCAL Tg	TOTAL Tg
1	1		RESERVOIR, 630L, AKV STEEL		2300,-	2 300,-		7 770,-
2	1		FILM EVAPORATOR, 92L/H, AKV STEEL		15100,-	15 100,-		51 040,-
3	1		CONDENSER, 1m², AKV STEEL		1100,-	1 100,-		3 720,-
4	2		RESERVOIRS, 150L		200,-	400,-		1 350,-
5	1		PUMP		100,-	100,-		340,-
6			PIPING AND FITTINGS			2 100,-		7 100,-
7			ELECTRICITY WIRING-COMMERCIAL SUPPLY			200,-		680,-
8			MEASURING AND REGULATION-COMMERCIAL SUPPLY			200,-		680,-
			TOTAL			21.500,-		72.680,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO [illegible]

ESTIMATE OF INVESTMENT COST : EQUIPMENT

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-08 DESCRIPTION -MANUFACTURE OF TABLETS

	PIECES		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tk	COST TOTAL Tk
1	1		KETTLE,50L,AKV STEEL		500	- 500,-		1 690,-
2	1		SIEVE, AKV STEEL		50	- 50,-		170,-
3	1		TRAY DRIER		1700	-1 700,-		5 750,-
4	1		TABLETTING MACHINE		12500	12 500,-		42 250,-
5	1		FILM-COATING MACHINE		8500	-8 500,-		28 730,-
6	1		FILLING MACHINE		14400	14 400,-		48 670,-
7	1		ELECTRICITY WIRING-COMMERCIAL SUPPLY			3 200,-		10 820,-
				TOTAL		40,850,-		138.080,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 6-3/

ESTIMATE OF INVESTMENT COST : EQUIPMENT

ESTIMATE OF INVESTMENT COST								
EQUIPMENT								
PROJECT COMPONENT No.A-09 DESCRIPTION-MANUFACTURE OF STERILE PREPARATIONS								
	PIECES		ITEM DESCRIPTION	UNIT COST	COST			
					FOREIGN US Dollars	LOCAL Tg	TOTAL Tg	
1	1		STERILIZER FOR CONTAINERS AND UTENSILS	400,-	400,-		1 350,-	
2	1		SEITZ FILTER	7600,-	7 600,-		25 [illegible]90,-	
3	1		FILLING MACHINE	600,-	600,-		2 030,-	
4	1		SHELL-FREEZING APPA-RATUS	800,-	800,-		2 700,-	
5	2		RECONSTRUCTION OF EXISTING FREEZE-DRYING PLANT-LEYBOLT	1900,-	3 800,-		12 840,-	
6	1		LAMINAR FLOW	15100	15 100,-		51 040,-	
7	1		FILLING LINE+CAP CRIMPING LINE	203300,-	203 300,-		687 230,-	
8	1		DOUBLE-DOOR AUTOCLAVE	1600,-	1 600,-		5 400,-	
9	1		TRAY DRIER	1900,-	1 900,-		6 420,-	
10			ELECTRICITY WIRING-COMMERCIAL SUPPLY		1 500,-		5 070,-	
			TOTAL		236.600,-		799.770,-	

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 6-3/

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-10 DESCRIPTION-LABORATORY QUALITY CONTROL

	PIECES		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
1	4		LABORATORY BENCH, WET		380,-	1 500,-		5 070,-
2	10		LABORATORY BENCH, DRY		230,-	2 300,-		7 770,-
3	8		REFRIGERATOR, 300L		375,-	3 000,-		10 140,-
4	10		THERMOSTAT-CONTROLLED OVEN		230,-	2 300,-		7 770,-
5	4		FUME CUPBOARD		750,-	3 000,-		10 140,-
6	2		pH-METER--RADELKIS		1500,-	3 000,-		10 140,-
7	1		SPECTROPHOTOMETER UNICAM		15100,-	15 100,-		51 040,-
8	1		ULTRATHERMOSTAT BATH		400,-	400,-		1 350,-
9	4		STERILIZERS		375,-	1 500,-		5 070,-
				TOTAL		32.100,-		108.490,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 6-3/

SCHEDULE 6-2/11

ESTIMATE OF INVESTMENT COST : EQUIPMENT

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-11 DESCRIPTION-SOLVENT RECUPERATION PLANT

	PIECES		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tk	COST TOTAL Tk
1	1		RESERVOIR,100L,GLASS		100,-	100,-		340,-
2	1		RECTIFICATION PLATE COLUMN,DIAM. 400mm, HEIGHT12m, GLASS		9800,-	9 800,-		33120,-
3	1		RESERVOIR,100L,GLASS		100,-	100,-		340,-
4	2		RESERVOIR,50L, GLASS		25,-	50,-		170,-
5	1		RECTIFICATION PACKED COLUMN,DIAM.300mm, GLASS		7200,-	7 200,-		24340,-
6			PIPING AND FITTINGS		800,-	800,-		2700,-
			TOTAL			18.050,-		61.010,-

[illegible] TOTAL OF ELC[illegible]

INVESTMENT COST : EQUIPMENT

INVESTMENT COST

No.A-12 DESCRIPTION-WATER DEMINERALIZATION PLANT

		ITEM DESCRIPTION	UNIT COST	COST FOREIGN US Dollars	LOCAL Tg	TOTAL Tg
1	1	DEMINERALIZATION PLANT, 200L/H, GLASS	4 200,-	4 200,-		14 200,-
2	1	RESERVOIR, 1500L, ARV STEEL	3 800,-	3 800,-		12 840,-
3	1	[illegible]	200,-	200,-		680,-
		[illegible], JACKETED, [illegible], ARV STEEL	3 400,-	3 400,-		11 490,-
		CONDENSER, $0.5m^2$, ARV STEEL	800,-	800,-		2 700,-
6	1	CONDENSER, $2m^2$, ARV STEEL	1 500,-	1 500,-		5 070,-
7	1	RESERVOIR, 1500L, ARV STEEL	3 800,-	3 800,-		12 840,-
8		PIPING AND FITTINGS		1 100,-		3 720,-
9		ELECTRICITY WIRING-COMMERCIAL SUPPLY		100,-		340,-
10		[illegible]RING AND REGU- [illegible]-COMMERCIAL [illegible]Y		400,-		1 350,-
		TOTAL		19.300,-		65.230,-

TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 6-3/

ESTIMATE OF INVESTMENT COST : EQUIPMENT

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-13 DESCRIPTION- ENGINE ROOM FOR STEAM AND HOT WATER PRODUCTION

	PIECES		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
1	1		CONDENSATE RECEIVER		600,-	600,-		2 030,-
2	1		STEAM BOILER, 1600L		800,-	800,-		2 700,-
3	1		WARM WATER TANKS, $4m^3$, EACH		500,-	500,-		[illegible],-
4	2		CIRCULATION PUMPS		300,-	600,-		2 030,-
5			PIPING AND FITTINGS			300,-		1 010,-
6			ELECTRICITY WIRING-COMMERCIAL SUPPLY			200,-		680,-
			TOTAL			3.000,-		10.140,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 6-3/

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-14 DESCRIPTION-NEUTRALIZATION PLANT

	PIECES		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
1	2		RESERVOIR, 2,5 m^3, GLAS-REINFORCED PLASTIC		750,-	1 500,-		5 070,-
2	1		RESERVOIR FOR SULPHURIC ACID, KOROSET		800,-	800,-		2 700,-
3	1		RESERVOIR FOR CALCIUM HYDROXIDE SUSPENSION /LIME MILK/		500,-	500,-		1 [illegible],-
4	1		PUMP		300,-	300,-		1 010,-
5			PIPING AND FITTINGS			300,-		1 010,-
6			ELECTRICITY WIRING-COMMERCIAL SUPPLY			300,-		1 010,-
7			MEASURING AND REGULATION-COMMERCIAL SUPPLY			3 3[illegible],-		11 1[illegible],-
			TOTAL			7.000,-		23 640,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 6-3/

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-15 DESCRIPTION-STORE FOR INFLAMMABLE SOLVENTS

	PIECES		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
1	5		STORAGE TANK		1820,-	9 100,-		30 760,-
2	10		PUMP		260,-	2 600,-		8 790,-
3			PIPING AND FITTINGS			1 900,-		6 420,-
4			ELECTRICITY LIGHTING-COMMERCIAL SUPPLY			400,-		1 350,-
5			MEASUREMENT AND REGULATION-COMMERCIAL SUPPLY			4 500,-		15 210,-
			TOTAL			18.500,-		62.530,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 6-3/

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-16 DESCRIPTION- CENTRAL PRESSURE AIR

	PIECES		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	LOCAL Tg	TOTAL Tg
1	2		COMPRESSOR		2250,-	4 500,-		15 210,-
2	1		PRESSURE TANK		400,-	400,-		1 350,-
3	2		WET AIR PUMP		850,-	1 700,-		5 750,-
4			PIPING AND FITTINGS			800,-		2 700,-
5			ELECTRICITY WIRING-COMMERCIAL SUPPLY			400,-		1 350,-
			TOTAL			7.800,-		26.360,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 6-3/

SCHEDULE 6-2/17

ESTIMATE OF INVESTMENT COST : EQUIPMENT

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-17 DESCRIPTION - COOLING PLANT

	[illegible]		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	LOCAL Tg	TOTAL Tg
1	2		COMPRESSOR PLANT, FREON, 10000-20000 KCAL/H		4550,-	9 100,-		30 760,-
2	1		COMPRESSOR PLANT, 200 000 KCAL/H		30300,-	30 [illegible],-		102 410,-

ESTIMATE OF INVESTMENT COST : EQUIPMENT

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-18 DESCRIPTION - TRANSFORMER STATION 35/04 kV

	HEC.		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
1	2		TRANSFORMER AIR-COOLED 630KW		12850,-	25 700,-		86.870,-
2	1		SWITCHBOARD ROOM, HIGH VOLTAGE		19700,-	19 700,-		[illegible],-
			TOTAL			45.400,-		153.460,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET / SCHEDULE 6-3.

ESTIMATE OF INVESTMENT COST : EQUIPMENT

ESTIMATE OF INVESTMENT COST								
EQUIPMENT								
PROJECT COMPONENT No.A-19 [illegible] - AIR CONDITIONING [illegible]								

	PIECES		ITEM DESCRIPTION		UNIT COST	COST		
						FOREIGN US Dollars	LOCAL Tg	TOTAL Tg
1	7		VENTILATORS		428,-	3 000,-		10 140,-
2			AIR-CONDITIONING UNIT			3 000,-		10 140,-
3	7		LOCAL EXHAUSTORS		214,-	1 500,-		5 070,-
4			ELECTRICITY WIRING-COMMERCIAL SUPPLY			800,-		2 700,-
			TOTAL			8.300,-		28.050,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 6-3/

ESTIMATE OF INVESTMENT COST : EQUIPMENT

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-20 DESCRIPTION - MAINTENANCE SHOPS

			ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
1			CURRENT WORKSHOP EQUIPMENT			9 100,-		30 760,-
2			ELECTRICITY WIRING-COMMERCIAL SUPPLY			800,-		2 700,-
			TOTAL			9.900,-		33.460,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 6-3/

ESTIMATE OF INVESTMENT COST

EQUIPMENT

PROJECT COMPONENT No.A-21 DESCRIPTION - IN-PROCESS TRANSPORTATION

	PIECES		ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
1	2		HIGH-LIFT TRUCKS, ACCUMULATOR-POWERED		4550,-	9 100,-		30 760,-
2	3		HOISTS, 2.0 t		7933,-	23 800,-		80 440,-
			TOTAL			32.900,-		111.200,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE 6-3/

SUMMARY SHEET - INVESTMENT COST

EQUIPMENT

No.	DESCRIPTION	FOREIGN US Dollars	LOCAL Tg	TOTAL Tg
A-01	PRODUCTION OF PEPTONE	233 200,-		788 200,-
A-02	PRODUCTION OF PEPSIN	43 400,-		146 680,-
A-03	PRODUCTION OF TRYPSIN, CHYMO-TRYPSIN AND PANCYPSIN	34 200,-		115 590,-
A-04	PRODUCTION OF CHOLESTEROL	84 000,-		283 920,-
A-05	PRODUCTION OF PANCREATIN	29 800,-		100 740,-
A-06	PRODUCTION OF BLOOD HYDROLYSATE	38 800,-		131 140,-
A-07	PRODUCTION OF DRIED BILE	21 500,-		72 680,-
A-08	MANUFACTURE OF TABLETS	40 850,-		138 080,-
A-09	MANUFACTURE OF STERILE PREPARATIONS	236 600,-		799 770,-
A-10	LABORATORY QUALITY CONTROL UNIT	32 100,-		108 490,-
A-11	RECUPERATION OF ETHANOL AND ACETONE	18 050,-		61 010,-
A-12	PREPARATION OF DEMINERALIZED AND OF PYROGEN-FREE WATER	19 300,-		65 230,-
A-13	STEAM AND CONDENSATE STATION	3 000,-		10 140,-
A-14	NEUTRALIZATION PLANT	7 000,-		23 640,-
A-15	INFLAMMABLE SOLVENT STORE	18 500,-		62 530,-
A-16	VACUUM AND PRESSURE-AIR CENTRAL STATION	7 800,-		26 360,-
A-17	EQUIPMENT FOR REFRIGERATOR	39 400,-		133 170,-
A-18	TRAFO - 35/0,4 KV	45 400,-		153 460,-
A-19	AIR CONDITIONING EQUIPMENT	8 300,-		28 050,-
A-20	EQUIPMENT MAINTENANCE	9 900,-		33 460,-
A-21	EQUIPMENT FOR TRANSPORT	32 900,-		111 200,-
	TOTAL	1004.000,-	600.000,-	3993.540,-

/INSERT TOTAL IN SCHEDULE 10-1/1/

CIVIL ENGINEERING WORKS

The building site preparation evidently will be limited to terrain adaptation. The site as a whole is plane, with numerous terrain deformations. No special construction works or outdoor buildings will be necessary in the realization of the pilot plant.

The pilot plant proper consists of three buildings.

A basic construction module 6m x 6m was chosen, which from the aspect of the building work is convenient for any or all of the following constructions:

- reinforced concrete monolithic constructions
- assembled precast reinforced concrete constructions
- steel constructions
- brick constructions

We recommend the assembled precast reinforced concrete construction, partially with inserted steel ceilings /production part in the biochemical section/. This method ensures the fastest progression of the construction work, and even in the hardest climatic conditions can be realized at any time whatever.

The building B-109 Biochemical section consists of transverse modules 6m + 3m + 6m and longitudinal modules 9 x 6m. The ground modular grid, therefore, is 54m x 15m. The construction height of the three floors is 4,20m + 4,80m + 4,80m.

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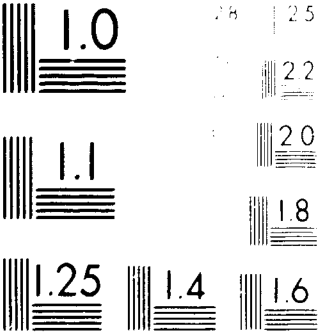
1.0
2.5
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The building B-110 Pharmaceutical section consists of transverse modules 2 x 6m and longitudinal modules 7 x 6m. The ground modular grid is 42m x 12m. Two floors of 4,20m height each are provided.

The building B-111 Laboratories consists of transverse modules 6m + 3m + 6m and longitudinal modules 7 x 6m. The ground modular grid is 42m x 15m. Three floors of 4,20m height each are provided.

The remaining construction work has the character of current energy and water supply and sewage networks or of roadbuilding.

The materials for the carcassing are fairly well available in Mongolia, including bricks, moulded bricks, expanded materials, cement, sand, gravel sand, typized reinforced concrete elements, timber, and lime.

For electricity, heating, air conditioning, water piping, and sewage piping installations the materials have to be imported; special floor coverings, steel construction materials, and tiles have to be imported as well.

In Mongolia, at present, industrial constructions and buildings are realized with so-called technical aid. This means that the Mongolian side provides workmen, and the management is entrusted to foreign specialists. Mechanisms for building equipment are imported. The local climatic conditions at certain phases of construction hamper the adherence to the planned working schedule.

The estimation of building work costs is based on:

- prospecting at the expected realization site
- comparisons of building works already realized with the planned ones
- technical documentation included in the present report
- calculations of basal measure values for individual premises B-101 to B-111
- expert estimation per measure unit

Calculation and quantitation of work for individual premises:

B-101 Preparation of THE LAND FOR BUILDINGS
- terrain preparation m^2 8 000
- provisional fencing m 300

B-102 OUTSIDE CONNECTIONS OF ELECTRICITY
35/0.4 KV

B-103 OUTSIDE CONNECTIONS OF WATER SUPPLY
- 400m

B-104 OUTSIDE CONNECTIONS OF LOW VOLTAGE ELECTRICITY
- 1 000m

B-105 OUTSIDE CONNECTIONS OF STEAM /PIPE LINES/
- 1 200m

B-106 OUTSIDE CONNECTIONS TO CITY SEWAGE
- 180m

B-107	[illegible]		
	- 550m length		
	- 6m width	m^2	3 300
B-108	STORE FOR LIQUID MATERIAL		
	- 5 tanks		
B-109	BUILDING FOR PILOT PLANT - BIOCHEMISTRY		
	- building 55m x 16m x 15m	m^3	13 200
	- 5m x 16m x 17m	m^3	1 360
	- platform 5m x 16m x 1m	m^3	80
		m^3	14 640
B-110	BUILDING FOR PILOT PLANT - PHARMACY		
	- building 43m x 13m x 10m	m^3	5 590.
	- platform 50m x 3m x 1m	m^3	150
		m^3	5 740
B-111	BUILDING FOR QUALITY CONTROL, AUXILIARY UNITS, SOCIAL DEVICES		
	- building 43m x 16m x 13m	m^3	8 950
		m^3	8 950

ESTIMATE OF INVESTMENT COST : CIVIL ENGINEERING WORKS

ESTIMATE OF INVESTMENT COST

CIVIL ENGINEERING WORKS

PROJECT COMPONENT No. B-101 DESCRIPTION: PREPARATION OF THE LAND FOR BUILDING

			ITEM DESCRIPTION		UNIT COST	COST US Dollars FOREIGN	Tg LOCAL	Tg TOTAL
1			B-101 PREPARATION OF THE LAND FOR BUILDING					
			- TERRAIN PREPARATION AREA 8 000 m^2 COST PER UNIT: 11,25 Tg 8 000. 11,25				90.000,-	90.000,-
			- PROVISIONAL FENCING LENGTH 500m COST PER UNIT: 60 Tg 60 . 50				30.000,-	30.000,-
			TOTAL				120.000,-	120.000,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE

ESTIMATE OF INVESTMENT COST : CIVIL ENGINEERING WORKS

ESTIMATE OF INVESTMENT COST

CIVIL ENGINEERING WORKS

PROJECT COMPONENT No. B-102 DESCRIPTION OUTSIDE CONNECTIONS OF ELECTRICITY 35/0.4 KV

			ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
1			B-102 OUTSIDE CONNECTIONS OF ELECTRICITY 35/0.4 KV					
			EXPERT ESTIMATION				130.000,-	130.000,-
			- MAIN 35 KV					
			- CONNEXION					
			- HIGH-VOLTAGE CELLS					
			TOTAL				130.000,-	130.000,-

CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET SCHEDULE ...

ESTIMATE OF INVESTMENT COST : CIVIL ENGINEERING WORKS

ESTIMATE OF INVESTMENT COST

CIVIL ENGINEERING WORKS

PROJECT COMPONENT No B-103 DESCRIPTION OUTSIDE CONNECTIONS OF WATER SUPPLY

			ITEM DESCRIPTION		UNIT COST	COST		
						FOREIGN US$	LOCAL Tg	TOTAL Tg
1			B-103 OUTSIDE CONNECTIONS OF WATER SUPPLY					
			LENGTH 400m					
			COST PER UNIT: 125 Tg					
			400 x 125				50.000,-	50.000,-
			TOTAL				50.000,-	50.000,-

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY SHEET /SCHEDULE [illegible]

SCHEDULE 6-4/4

ESTIMATE OF INVESTMENT COST : CIVIL ENGINEERING WORKS

ESTIMATE OF INVESTMENT COST

CIVIL ENGINEERING WORKS

PROJECT COMPONENT No B-104 DESCRIPTION OUTSIDE CONNECTIONS OF LOW VOLTAGE ELECTRICITY

			ITEM DESCRIPTION		UNIT COST	COST FOREIGN US.D.	COST LOCAL Tg	COST TOTAL Tg
1			B-104 OUTSIDE CONNECTIONS OF LOW VOLTAGE ELECTRICITY					
			LENGTH 1 000m					
			COST PER UNIT:					
			30 Tg					
			1 000 x 30				30.000,-	30.000,-
			TOTAL				30.000,-	30.000,-

CARRY OVER TOTAL PROJECT COMPONENT TO SUMMARY

ESTIMATE OF INVESTMENT COST : CIVIL ENGINEERING WORKS

ESTIMATE OF INVESTMENT COST

CIVIL ENGINEERING WORKS

PROJECT COMPONENT No. B-105 DESCRIPTION OUTSIDE CONNECTIONS OF STEAM /PIPE LINES/

			ITEM DESCRIPTION		UNIT COST	COST FOREIGN US $	COST LOCAL Tg	COST TOTAL Tg
1			B-105 OUTSIDE CONNECTION OF STEAM /PIPE LINES/					
			LENGTH 1 000m					
			COST PER UNIT: 80 Tg					
			1 000 x 80				80.000,-	80.000,-
			TOTAL				80.000,-	80.000,-

/CARRY OVER TOTAL OF PROJECT COMPONENT TO ...

SCHEDULE 6-4/6

ESTIMATE OF INVESTMENT COST : CIVIL ENGINEERING WORKS

ESTIMATE OF INVESTMENT COST

CIVIL ENGINEERING WORKS

PROJECT COMPONENT No. B-106 DESCRIPTION OUTSIDE CONNECTIONS TO CITY SEWAGE

			ITEM DESCRIPTION		UNIT COST	COST FOREIGN Tg.	COST LOCAL Tg	COST TOTAL Tg
1			B-106 OUTSIDE CONNECTIONS TO CITY SEWAGE LENGTH 500m COST PER UNIT: 500 Tg 500 x 500				250.000,-	250.000,-
TOTAL							250.000,-	250.000,-

SCHEDULE 6-4/7

ESTIMATE OF INVESTMENT COST : CIVIL ENGINEERING WORKS

ESTIMATE OF INVESTMENT COST

CIVIL ENGINEERING WORKS

PROJECT COMPONENT No.B:107 DESCRIPTION :COMMUNICATIONS /OUTSIDE/

			ITEM DESCRIPTION		UNIT COST	COST US $ FOREIGN	Tg LOCAL	Tg TOTAL
1			B-107 COMMUNICATIONS /OUTSIDE/					
			AREA 3 300m²					
			COST PER UNIT:					
			151,50 Tg					
			3 300 . 151,50				500.000,-	500.000,-
			TOTAL				500.000,-	500.000,-

[illegible]

ESTIMATE OF INVESTMENT COST : CIVIL ENGINEERING WORKS

ESTIMATE OF INVESTMENT COST

CIVIL ENGINEERING WORKS

PROJECT COMPONENT No. B-108 DESCRIPTION: STORE FOR LIQUID MATERIAL

			ITEM DESCRIPTION		UNIT COST	COST FOREIGN US.$	COST LOCAL Tk	COST TOTAL Tk
1			B-108 STORE FOR LIQUID MATERIAL BUILDING WORK FOR STORAGE OF INFLAMMABLE SOLVENTS - TERRAIN WORK - FUNDAMENTS FOR TANKS - ENTRANCES - BACK FILL - TERRAIN FINISHING - CONNECTING CHANNELS EXPERT ESTIMATION				150.000,-	150.000,-
			TOTAL				150.000,-	150.000,-

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY [illegible]/

ESTIMATE OF INVESTMENT COST : CIVIL ENGINEERING WORKS

ESTIMATE OF INVESTMENT COST

CIVIL ENGINEERING WORKS

PROJECT COMPONENT No. B-109 DESCRIPTION : BUILDING FOR PILOT PLANT - BIOCHEMISTRY

			ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tk	COST TOTAL Tk
1			B-109 BUILDING FOR PILOT PLANT - BIOCHEMISTRY					
			AGGREGATE CUBIC SPACE 14 640 m^3					
			COST PER UNIT: 307,90 Tk					
			14 640 . 307,90				4,508.000,-	4,508.000,-
			TOTAL				4,508.000,-	4,508.000,-

SCHEDULE 6-4/1C

ESTIMATE OF INVESTMENT COST : CIVIL ENGINEERING WORKS

ESTIMATE OF INVESTMENT COST

CIVIL ENGINEERING WORKS

PROJECT COMPONENT No. B-110 DESCRIPTION : BUILDING FOR PILOT PLANT - PHARMACY

			ITEM DESCRIPTION		UNIT COST	COST FOREIGN	COST LOCAL	COST TOTAL
1			B-110 BUILDING FOR PILOT PLANT - PHARMACY					
			AGGREGATE CUBIC SPACE: 5 740 m^3					
			COST PER UNIT: 273,20 Tg					
			273,20 x 5 740				1,568000,-	1,568000,-
			TOTAL				1,568000,-	1,568.000,-

/CARRY OVER TOTAL OF PROJECT COMPONENT TO SUMMARY

SCHEDULE 6-4/11

ESTIMATE OF INVESTMENT COST : CIVIL ENGINEERING WORKS

ESTIMATE OF INVESTMENT COST

CIVIL ENGINEERING WORKS

PROJECT COMPONENT No. B-111 DESCRIPTION : BUILDING FOR QUALITY CONTROL, AUXILIARY UNITS, ~~SOCIAL DEVICES~~

			ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
1			B-111 BUILDING FOR QUALITY CONTROL, AUXILIARY UNITS, SOCIAL DEVICES					
			AGGREGATE CUBIC SPACE : 8 950 m^3					
			COST PER UNIT: 261,80 Tg					
			8 950 . 261,80				2343000,-	2343000,-
			TOTAL				2343000,-	2343000,-

SUMMARY SHEET - INVESTMENT COST

CIVIL ENGINEERING WORKS

No	PROJECT COMPONENT DESCRIPTION	INVESTMENT COST CARRIED OVER FOREIGN	LOCAL	TOTAL
B-101	PREPARATION OF THE LAND FOR BUILDING		120 000,-	120 000,-
B-102	OUTSIDE CONNECTIONS OF ELECTRICITY 35/0.4 KV		130 000,-	130 000,-
B-103	OUTSIDE CONNECTIONS OF WATER SUPPLY		50 000,-	50 000,-
B-104	OUTSIDE CONNECTIONS OF LOW VOLTAGE ELECTRICITY		30 000,-	30 000,-
B-105	OUTSIDE CONNECTIONS OF STEAM /PIPE LINES/		80 000,-	80 000,-
B-106	OUTSIDE CONNECTIONS TO CITY SEWAGE		250 000,-	250 000,-
B-107	COMMUNICATIONS /OUTSIDE/		500 000,-	500 000,-
B-108	STORE FOR LIQUID MATERIAL		150 000,-	150 000,-
B-109	BUILDING FOR PILOT PLANT - BIOCHEMISTRY		4508 000,-	4508 000,-
B-110	BUILDING FOR PILOT PLANT - PHARMAC.		1568 000,-	1568 000,-
B-111	BUILDING FOR QUALITY CONTROL, AUXILIARY UNITS, SOCIAL DEVICES		2343 000,-	[illegible],-
	TOTAL		9729.000,-	9729.000,-

INSERT TOTAL IN SCHEDULE 1C-1/1

ESTIMATE OF PRODUCTION COST

CIVIL ENGINEERING WORKS

PROJECT COMPONENT

			ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	COST LOCAL Tg	COST TOTAL Tg
			MAINTENANCE AND REPAIR OF WORKS OF:					
			SITE PREPARATION AND DEVELOPMENT,					
			BUILDINGS AND SPECIAL CIVIL WORKS,					
			OUTDOOR WORKS					
			5,9% /SCHEDULE 6-3/ 3,993.540,- Tg				235.000	235.000
			5,9% /SCHEDULE 6-5/ 9,729.000,- Tg				574.000	574.000
			TOTAL				809.000,-	809.000,-

INSERT TOTAL IN SCHEDULE 6-7

SUMMARY SHEET - PRODUCTION COST

CIVIL ENGINEERING WORKS

PROJECT COMPONENT		PRODUCTION COST CARRIED OVER		
No	DESCRIPTION	FOREIGN	LOCAL Tg	TOTAL Tg
1	PRODUCTION COST		809.000,-	809.000,-
	TOTAL		809.000,-	809.000,-

INSERT TOTAL IN SCHEDULE 7-1

Assumed suppliers of the proposed equipment are as follows:

1/ Enameled vessels and reactors	Hungaria
2/ Equipment, manufactured from stainless steel and common steel	CSSR
3/ Equipment manufactured from glass	CSSR
4/ Filling and tablet-making machines and some special equipment for laboratory control	GFR
5/ Spray drier	Denmark or Sweden
6/ Vacuum drying machines	GDR
7/ Common equipment for laboratory control	CSSR
8/ Cooling machines	CSSR
9/ Transformers and the equipment for electricity distribution	CSSR
10/ Fittings and pipelines	CSSR

CHAPTER VII. PLANT ORGANIZATION AND OVERHEAD COSTS

CONTENTS :

COST CENTRES

From the organizational aspect of the new biochemical integrated works, the projected pilot plant for biochemical production for pharmaceutical purposes will operate as an integral cost centre.

This decision is based on that the pilot plant includes facilities for pilot-plant-scale operations, requiring a complete cooperation and coordination among

- the production departments
- the power supplies
- the store operations
- the auxiliary services
- the social facilities and services
- the quality control unit
- the management system

The technical disposition plan is adapted to the described concept, providing immediate direct interconnections between

- the biochemical production and the quality control unit
- the biochemical production and the pharmaceutical manufacture
- the pharmaceutical manufacture and the quality control unit.

Evidently, the pilot plant operates as an integral dispositional whole, and the raw material input and finished product output will be assessed in a uniform way. The transfer of documentation from the pilot plant for full-scale production will be made in the form of a separate master file for each final product.

The production plan, although specified in the pertinent chapter inclusive of the capacities, may be considerably variable. The disposition must allow a fast variation of the programme with regard to the actual results of the research.

Despite the great complexity of all operations, the extent of the pilot plant proper is adequate to its pre--production mission, and therefore the pilot plant is provided to constitute an integral cost centre.

OVERHEAD COSTS

Theauthors of the present chapter have decided, having taken into consideration the propositions, to combine the factory and administrative overheads and not to respect them separately.

The structure of the socialist society, also reflected in the industrial enterprises in Mongolia, presumes that the overhead costs include the following items:

- property taxes
- depreciation:
  - buildings /2.6% per year/
  - machinery /13 % per year/
  - office equipment /3.5% per year/
- communication
- off-site transport
- maintenance

Administrative costs, costs of building management, labourers' wages and social security contributions are included in the pertinent chapters and not included in Chapter VII.

It is pointed out that the insurance fees /social security contributions/ and the income taxes of both employees and labourers are already included in their basic salaries and hour wages /see Chapter VIII/.

Consequently, the authors of the present report will adhere to the recommended calculation alternative 1, and consider solely the remaining overhead costs, as specified in Schedule 7-1.

OVERHEAD COSTS

OVERHEAD COSTS								
			ITEM DESCRIPTION		UNIT COST	COST FOREIGN US Dollars	LOCAL Tg	TOTAL Tg
1.			INSURANCE				60000,-	60000,-
2.			WASTES DISPOSAL				5000,-	5000,-
3.			TRAVELLING EXPENSES				15000,-	15000,-
4.			WORK CLOTHING				10000,-	10000,-
5.			DEPRECIATIONS:					
			a/ BUILDING 2,6%				253000,-	253000,-
			b/ EQUIPMENT 13%				441000,-	441000,-
			c/ OFFICE SUPPLIERS 3,5%				4200,-	4200,-
			TOTAL				788200,-	788200,-

LABOUR

LABOURERS

The manning plan was elaborated with regard to the proposed production programme, the production capacities, and also to the local conditions.

Labourers have to be provided for the following sectors:

- biochemical production
- pharmaceutical production
- warehouse handling
- energy supply operation
- auxiliary facilities
- maintenance work
- clean-up services
- watching services

The manning for the biochemical production is planned so that no constant labourer teams are allotted to the individual production departments. The structure of the premises and equipment allows to concentrate the manpower for several production processes and thus to economize the operation /eg. the production of peptone, dried bile, and pancreatin share one and the same labourer team/.

The selection of the labourer categories was consulted with the Mongolian side with the following results:

labourer category 6B - qualified labourer with apprenticeship certificate

- experienced labourer - foreman or deputy foreman

5B - labourer with apprenticeship certificate in the branch of

- biochemical production
- pharmaceutical production
- maintenance
  - electricians
  - locksmiths
  - joiners
- energy supply operators

4B - labourers for assembling and storage handling

3B - charwomen, female packaging workers, forwarding department hands, gatekeepers.

WORKING DAYS PER YEAR

days per year 365.25
minus Sundays - 52.18

313.07 → 313

minus paid nonproductive working days

holidays	- 7 days	
leave of absence	- 26 days	/all-works leave minus 4 Sundays/
sick leave	- 17 days	
training	- 10 days	
other causes	- 5 days	
total	65 days	

313 - 65 = 248 days

working days per year 248

1 shift = 8 hours

working hours per year 8x248 = 1984 (for one worker)

194 (workers) × 1984 = 384 896 hours

121 (workers in the first shift) × 1984 = 240 064

$$\text{average number of shifts/day} = \frac{384\ 896}{240\ 064} = 1{,}6$$

SURCHARGE

- nonproductive working days	$\frac{65}{248} \times 100 =$	26%
- surcharge for plan filling		30%
- surcharge for shift work		56%
/labourers only/		10%
		66%

NOTE

Surcharges for leave of absence, holidays, social security, and wages tax are included in the basic wages and salaries.

SCHEDULE 8-1

MANNING TABLE - LABOUR

MANNING TABLE - LABOUR : FIXED

DEPARTMENT		WAGE CATEGORIES /No. OF WORKERS/				
FUNCTION		3B	4B	5B	6B	TOTAL
FOREMAN	I	----	----	2	4	6
	II	----	----	----	----	----
	III	----	----	----	----	----
DEPUTY FOREMAN	I	----	----	----	2	2
	II	----	----	----	1	1
	III	----	----	----	----	----
LABOURERS	I	20	18	22	----	60
	II	17	11	----	----	28
	III	1	----	----	----	1
TOTAL LABOUR		38	29	24	7	98

INSERT TOTAL IN SCHEDULE 8-2

NOTE : FOREIGN LABOURERS ARE NOT INCLUDED

SCHEDULE 8-1

MANNING TABLE - LABOUR

MANNING TABLE - LABOUR : VARIABLE							
DEPARTMENT		WAGE CATEGORIES /No OF WORKERS/					
FUNCTION	SHIFT	3B	4B	5B	6B	TOTAL
FOREMAN	I	---	---	---	5	5
	II	---	---	---	---	---
	III	---	---	---	---	---
DEPUTY FOREMAN	I	---	---	---	2	2
	II	---	---	---	4	4
	III	---	---	---	1	1
LABOURERS	I	---	2	25	19	46
	II	---	2	18	12	32
	III	---	---	4	2	6
TOTAL LABOUR		---	4	47	45	96

INSERT TOTAL IN SCHEDULE 8-2

NOTE: FOREIGN LABOURERS ARE NOT INCLUDED

GB	HB	[illegible]	[illegible]	TOTAL
—	—	2	4	6
—	—	—	3	3
38	29	22	—	89
39	29	24	7	99
[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

ESTIMATE OF [illegible] COSTS - WAGES

	ESTIMATE OF PRODUCT[illegible]				
[illegible]	[illegible] COSTS [illegible]				
[illegible]	3B	4B	5B	6B	TOTAL
FOREMAN	—	—	—	5	5
[illegible] FOREMAN	—	—	—	7	7
[illegible]	—	4	47	33	84
TOTAL NO. OF WORKERS	—	4	47	45	96
WORKING HOURS PER DAY	—	8	8	8	
WORKING DAYS PER YEAR	—	[illegible]	[illegible]	[illegible]	
HOURS PER YEAR	—	[illegible]	[illegible]	[illegible]	[illegible]
WAGE PER HOUR	—	2.15	2.43	[illegible]	
OVERHEAD 63%	—	[illegible]	[illegible]	[illegible]	
WAGES PER YEAR	—	[illegible]	[illegible]	[illegible]	
TOTAL		[illegible]	[illegible]	[illegible]	[illegible]

INSERT TOTALS IN SCHEDULE 10-11

STAFF

Technical and clerical workers

The manpower plan of these categories is based on the given economic and production structure, reflected in the organizatory regulations of the pilot plant; the following posts are provided:

- director of the pilot plant
- vice director - economics
  - production
  - research
- head, biochemical department
- head, pharmaceutical department
- head, quality control unit
- chief technologist
- chief engineer
- workers in accounting department
- workers in planning department
- workers in supply department
- workers in personnel department
- secretaries
- workers in staff education department
- librarian
- heads of analytical laboratories
- chief physicist
- chief biochemist
- chief analyst
- laboratory technicians

In the category of technicians and clerical workers, collaboration of foreign specialists is planned in the initial operation period /see Schedule 8-3/ and, on the other hand, training of Mongolian workers in selected foreign countries with advanced biological production.

For the purposes of Mongolian workers' training, shorter or longer visits to foreign countries are envisaged.

Shorter visits /2-4 weeks/ are intended to improve the training in the spheres of

- biochemical production processes
- biochemical production planning
- production management
- good manufacturing practice

Longer visits are envisaged for

- 3 biochemists
- 3 quality control specialists
- 2 pharmacists

Training directly at the pilot plant in Mongolia will be organized and supervised by the following persons:

- chief engineer of construction
- specialist in biochemical production
- expert in quality control
- specialist in pharmaceutical production
- bacteriologist

The detailed plan for training and fellowship is enclosed in annex, page 23 and 24.

SCHEDULE 8 - 3

MANNING TABLE - STAFF

MANNING TABLE - STAFF							
DEPARTMENT		SALARY CATEGORIES (SALARIES					
FUNCTION		1200,-	1000,-	800,-	750,-	700,-	
DIRECTOR	M	1					
VICE DIRECTOR	M		3				
HEADS OF DEPARTMENTS B + P	M			2			
HEAD, QUALITY CONTROL UNIT	M			1			
CHIEF TECHNOLOGIST	M				1		
CHIEF ENGINEER	M				1		
ACCOUNTING DEPT.	A						
PLANING DEPT.	A						
SUPPLY DEPT.	A						
PERSONEL DEPT.	A						
SECRETARY	A						
STAFF EDUCATION DEPT.	A						
LIBRARIAN	A						
HEADS OF ANALYT.LABS	CL					4	
CHIEF PHYSICIST	CL						
CHIEF BIOCHEMIST	CL						
ANALYST	CL						
LABORATORY ASSISTANT	CL						
TOTAL STAFF		[illegible]	3	3	2	4	

[illegible] CL = CONTROL LA[illegible]

... S PER MONTH) - No OF STAFF

... -650,-	600,-	550,-	500,-	450,-	TOTAL
					1
					3
					2
					1
					1
					1
		5			5
		2			2
		2			2
		2			2
				6	6
1					1
		1			1
					4
1					1
1					1
	3				3
			8		8
3	3	12	8	6	45

SCHEDULE 8 - 4

ESTIMATE OF PRODUCTION COSTS : SALARIES

ESTIMATE OF PRODUCTION COSTS - SALARIES

DEPARTMENT	SALARY CATEGORIES (SALARIES PER MONTH) - No OF STAFF										
DESCRIPTION	1200,-	1000,-	800,-	750,-	700,-	650,-	600,-	550,-	500,-	450,-	TOTAL
MANAGEMENT	1	3	3	2	-	-	-	-	-	-	9
ADMINISTRATION	-	-	-	-	-	1	-	12	-	6	19
CONTROLLABOR.	-	-	-	-	4	2	3	-	8	-	17
TOTAL No.OF STAFF	1	3	3	2	4	3	3	12	8	6	45
WORKING MONTHS PER YEAR	12	12	12	12	12	12	12,	12	12	12	-
MAN-MONTHS PER YEAR	12	36	36	24	48	36	36	144	96	72	-
SUCHARGE 56 %	672,-	560	448,-	420,-	392,-	364,-	336,-	308,-	280,-	252,-	-
SALARIES PER YEAR	22464,-	18720,-	14976,-	14040,-	13104,-	12168,-	11232,-	10296,-	9360,-	8424,-	-
TOTAL	22464,-	56160,-	44928,-	28080,-	52416,-	36504,-	33696,-	123552,-	74880,-	50544,-	52322

ANNEX TO CHAPTER VIII

DOCUMENTATION FROM
MONGOLIA

№ п/п	Наименование должностей	Коли-чество	Месячная зарплата	Месячный зарплатный фонд	Годовой зарплатный фонд
1.	Начальник цеха	14	750	10500	1[illegible]3000
2.	Инженер механик	I	700–750	7[illegible]	8700
3.	Инженер технолог	I	700–7[illegible]	7[illegible]	8700
4.	Инженер экономист	I	70[illegible]–7[illegible]0	7[illegible]	8700
5.	Инженер по ре[illegible]раторным установкам	I	70[illegible]–750	7[illegible]	8700
6.	Инженер электрик	I	70[illegible]–750	7[illegible]	8700
7.	Заведующий отделом технического контроля	I	800	8[illegible]0	9[illegible]00
8.	Заведующий [illegible]-биохимической лабораторией	I	750	750	9000
9.	[illegible]	[illegible]	650–750	70[illegible]	8[illegible]00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible] 2620	7[illegible]		87[illegible]	[illegible]7[illegible]0

[illegible] VIII
[illegible] 17

[illegible]
[illegible]СКОГО ЗАВОДА

п/п	Занимаемая должность	числен-ность	раз-ряд	тарифная сетка зарплаты	Фонд по времени	годовой зарплатный фонд /тугр/
	I. Цех [illegible]					
	I. Отделение [illegible]					
	Мастер	I	[illegible]	[illegible]-34	[illegible]0	[illegible]7
	Аппаратчик	[illegible]	[illegible]	[illegible]-84	[illegible]0	[illegible]
	Аппаратчик	[illegible]	[illegible]	2-[illegible]	[illegible]0	II4[illegible]4
	2. Отделение [illegible]					
	Мастер	I	[illegible]	[illegible]-84	2330	6017
	Аппаратчик	4	6B	2-[illegible]4	[illegible]330	26469
	Аппаратчик	2	5B	2-46	2330	II464
	3. Отделение [illegible]-очистки					
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]7
	[illegible]	6	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]					

I. Отделение листмана

I. Отделение экстракции					
Мастер	[illegible]	[illegible]	[illegible]	[illegible]0	[illegible]7
Аппаратчики	[illegible]	[illegible]	[illegible]	[illegible]0	[illegible]
Аппаратчики	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
. [illegible]					
[illegible]					
Статистики	2	[illegible]	2–[illegible]	2000	[illegible]
ВСЕГО:	37				213[illegible]4

II. Цех фибриной пленки

I. Отделение экстракции					
Мастер	I	6[illegible]	2–24	2000	6[illegible]7
Аппаратчики	2	63	2–24	2000	I0[illegible]
Аппаратчики	2	53	2–[illegible]	[illegible]0	II[illegible]
2. Отделение сушки					
Мастер	I	63	2–24	2030	6077
Аппаратчики	2	[illegible]	2–2[illegible]	2000	I0[illegible]
Аппаратчики	I	[illegible]	2–16	2000	57[illegible]
3. Отделение упаковки					
Мастер	I	6[illegible]	2–2[illegible]	2000	6077
Рабочие по сортировке	2	35	1–[illegible]	2[illegible]	8[illegible]
Этикетчики	2	33	I–[illegible]	2000	83[illegible]
Укупорщики	2	33	I–[illegible]	[illegible]	[illegible]

Упаковщик:	2	4В	2-13		
ИТОГО:	[illegible]				

IY. [illegible] помещения

1. Отделение [illegible]					
Мастер	I	[illegible]	[illegible]	[illegible]	[illegible]
Аппаратчик	[illegible]		[illegible]		
[illegible]					
[illegible]					
[illegible]					
[illegible]					
Аппаратчик	2	[illegible]	[illegible]	[illegible]	[illegible]
2. Отделение нейтрализации					
Мастер	I	6В	2-84	2000	6617
Аппаратчик	4	6В	2-84	2000	26400
Аппаратчик:	2	5В	2-46	2000	11404
3. Отделение фильтрации					
Мастер	I	6В	2-84	2000	6617
Аппаратчик:	4	6В	2-84	2000	26400
Аппаратчик:	2	5В	2-46	2000	11404
4. Отделение упаковки					
Мастер	I	6В	2-84	2000	6617
Рабочий по стерилизации	4	5В	1-85	2000	17942
Укупорщик:	2	3В	1-61	2000	[illegible]
Этикетчик:	2	3В	1-65	2000	[illegible]
Упаковщик:	4	4В	2-13	2000	[illegible]
ИТОГО:	34				194000

[illegible] VIII

[illegible]

[illegible]

1. Отделение [illegible]					
Мастер	I	6В	2-84	[illegible]	6617
Аппаратчик	4	6В	2-84	[illegible]	26469
Аппаратчик	2	5В	2-46	[illegible]	II434
2. Отделение сушки					
Мастер	I	6В	2-84	[illegible]	[illegible]
Аппаратчик	4	6В	2-84	[illegible]	[illegible]
Аппаратчик	2	5В	2-46	[illegible]	II464
3. Отделение дражировки					
Мастер	I	6В	2-84	[illegible]	6617
Аппаратчик	4	[illegible]	2-84	[illegible]	[illegible]
Аппаратчик	2	5В	2-[illegible]	[illegible]	[illegible]
4. Отделение упаковки					
Мастер	I	6В	2-84	[illegible]	6617
Рабочие по стерилизации	4	3В	I-35	[illegible]	I7242
Этикетчик	2	3В	I-35	[illegible]	862I
Укупорщик	2	3В	I-35	[illegible]	862I
Упаковщик	2	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]:	[illegible]				

[illegible]

[illegible]				
[illegible]			–	
[illegible]			–	
[illegible]			–	
[illegible]			–	
[illegible]			–	
[illegible]			–	
[illegible]			–	
[illegible]			–	
[illegible]			–	
[illegible]			–	
Мастер	I	[illegible]	[illegible]	[illegible]
Упаковщик	4	[illegible]	[illegible]	[illegible]
Рабочие по стерилизации	4	[illegible]	[illegible]	[illegible]
Этикетчик	2	[illegible]	[illegible]	[illegible]
Укупорщик	2	[illegible]	[illegible]	[illegible]
ИТОГО:	30			[illegible]

УП. Цех холестерина

I. Отделение экстракции					
Мастер	I	6В	2–84	2330	6617
Аппаратчик	2	6В	2–84	[illegible]	[illegible]4
Аппаратчик	I	5В	2–[illegible]	2330	5732
2. Отделение сушки					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	I	[illegible]	[illegible]	[illegible]	[illegible]
3. [illegible]					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]:	[illegible]				[illegible]

[illegible]

I. [illegible]					
[illegible]	I	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	8	[illegible]	2–[illegible]	[illegible]	[illegible]
Аппаратчик	2	5В	2–46	2330	II464
2. Отделение сушки					
Мастер	I	6В	2–84	2330	6617
Аппаратчик	2	6В	2–84	2330	I3234
Аппаратчик	I	5В	2–46	2330	5732
3. Отделение фильтрации					
Мастер	I	6В	2–84	2330	6617
Аппаратчик	2	6В	2–84	2330	I3234
Аппаратчик	I	5В	2–46	2330	5732
4. Отделение упаковки					
Мастер	I	6В	2–84	2330	6617
Рабочий по стерилизации	2	3В	I–85	2330	8621
Этикетчик	2	3В	I–85	2330	8621
Упаковщик	2	4В	2–13	2330	9926
Укупорщик	8	3В	I–85	2330	8621
ВСЕГО:	23				I31505

IX. Цех АТ[illegible]

I. Убойная					
Мастер	I	6В	2-34	2300	[illegible]7
Рабочие	[illegible]	6В	[illegible]	[illegible]	[illegible]
Рабочие	2	5В	[illegible]	[illegible]	[illegible]
2. От[illegible] [illegible]					
[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]
3. [illegible]					
[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]
[illegible]					
[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]
[illegible]					
[illegible]	I	[illegible]	[illegible]	[illegible]	[illegible]7
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Рабочие по [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Электрик	2	3В	I-05	2300	862I
ВСЕГО:	**33**				**189522**

X. Цех [illegible]

I. Отделение гидролиза					
Мастер	I	6В	2-34	2300	[illegible]7
Аппаратчик	4	6В	2-34	2300	26469
Аппаратчик	2	5В	2-16	2300	II464
2. Отделение [illegible]					
Мастер	I	6В	2-34	2300	66I7
Аппаратчик	2	6В	2-34	2300	I3[illegible]4
Аппаратчик	2	5В	2-16	2300	II464
3. Отделение сушки					
Мастер	I	6В	2-34	2300	66I7
Аппаратчик	2	6В	2-34	2300	I3234
Аппаратчик	2	5В	2-16	2300	II464

Study tours and Fellowships

1/ Study tours - are determined for key-personnel from Mongolia and should last 1 or 2 weeks. These study tours are assessed for the key-workers of the new proposed pilot plant: for its director and his deputies and for the chiefs of research- and quality control- departments. Programme of such study tours shall include:

- Studying of the economical problems connected with production of biochemical pharmaceuticals;
- Studying of the planning of such production;
- Studying of the main problems connected with running of such a factory;
- Getting acquainted with all the regulations for production of sterile final pharmaceutical products;
- Getting acquainted with the work of biochemical research and quality control departments;

We recommend these study tours to be realized either to Czechoslovakia - Prague - SPOFA or to Hungary - Budapest - - Gedeon Richter.

Proposed duration: 2m/m

2/ Fellowships

This part of training is determined for the folowing technical workers from Mongolia:

Foremen from the projected biochemical production units:

- to study the production of the main biochemical products, enzymes and hormones;
- to learn the right production practice;
- to get a good experience in running of the single biochemical production;
- to learn the good know-how of all the products planned for the production of the proposed pilot plant.

Proposed: 3 workers, 15m/m

Foremen from the pharmaceutical units of the plant:

- to learn all the necessary production practice, connected with preparation of sterile pharmaceutical products;
- to learn all the production practice with finalizing of the final forms of vials and ampoules;
- to get a good knowledge in preparing of pharmaceutical drugs like tablets and coated tablets;
- to learn the initial preparation of granulated mixtures:
- to get the necessary practice in correct pharmaceutical work.

Proposed: 2 workers, 12m/m

Quality control workers from the proposed analytical and bacteriological laboratories:

- to learn all the necessary control methods for testing of the biochemical final products;
- to learn the methods for testing of all raw materials;
- to study and to learn the methods for testing of activities of enzymes and heparin;
- to learn the polarographic and spectrophotometric methods used for control of final products;

- to learn all the necessary chemical and physically-chemical methods of analytical chemistry;
- to get a good knowledge of bacteriological testing of sterile pharmaceutical products;
- to learn the control methods for testing of the air-purity in sterile production rooms;
- to learn the basic principles of microbiological purity tests and of control methods for testing of correct hygienic conditions in pharmaceutical departments;
- to learn the necessary biological testing of biochemical products - bioassay of insulin, gonadotropins, testing of pyrogen and hypetensive impurities, bioassay for testing of pituitary hormones;
- to learn the right practice of test-animals breading and keeping and their preparation for biological tests.

Proposed: 3 workers 15m/m

For all the fellowships we recommend their performing in Czechoslovakia.

CHAPTER IX. IMPLEMENTATION SCHEDULING

CONTENTS :

DATA AND ACTIVITIES

Essential data and activities

The planned pilot plant is financed partially by the Mongolian Government and partially by the UNIDO, Regional Office Vienna. Both partners had agreed that the project would be realized in the period 1982 - 1986. The Mongolian Government will ensure the realization conditions in the full extent.

The obligations ensuring the realization are divided between both sides as follows.

The Mongolian Government ensures:

- the nomination of the managing body of the pilot plant construction
- contracts for delivery of project realization documentation
- contacts with authorities in Ulan Bator competent for approving the project
- methods for planning the pilot plant construction
- contracts for supplies of machinery
- suppliers of buildings in a full extent /inclusive of water pipelines, sewage drains, central heating, illumination wiring systems/
- agreements concerning the education and training of Mongolian personnel in foreign countries

- contracts with foreign experts for the running-in period of the pilot plant
- contracts for special assembling operations
- expert supervision of all professional activities in the pilot plant construction
- housing, boarding, and social facilities
- sanitary provisions
- fire protection
- safety of work and operation
- taking-over of buildings and equipment for permanent operation
- supply of labour and material for the pilot plant construction

The Mongolian Government finances:

- the building site /the representatives of the Mongolian Government had declared that the building site would be provided free of cost/
- the project realization documentation
- the experts supervising the pilot plant construction in all professions
- all buildings and plants included in the nomenclatures B-101 to B-111

- all assembling operations of the machinery and equipment
- preliminary operations
- state, municipal, and other official charges

The UNIDO Regional Office, Vienna, finances:

- the machinery and equipment specified in the lists A-01 to A-21
- the visits for the purpose of studies
- the training of Mongolian personnel in foreign countries
- selected special short-term assembling operations
- foreign experts supervising the running-in of the pilot plant

The financial and realization plan follows. The requirements of the UNIDO Regional Office, Vienna, are included in the plan. The plan had been discussed in Mongolia with all competent partners /UNDP/UNIDO, Mongolian Government/.

TABLE [illegible] HANDLING

MONGOLIAN GOVERNMENT	TOTAL T$	1982	1983	1984	1985	1986
EXPERTS	450	300	—	50	50	50
SUPPORT PERSONNEL	2026	24	209	412	620	832
BUILDINGS: B - 101	120	120	—	—	—	—
B - 102	130	—	130	—	—	—
B - 103	50	—	50	—	—	—
B - 104	30	—	30	—	—	—
B - 105	80		80	—	—	—
B - 106	250	—	250	—	—	—
B - 107	500	—	500	—	—	—
B - 108	150	—	—	—	150	—
B - 109	4303	—	1000	1400	1300	603
B - 110	1703	—	203	400	600	300
B - 111	2343	—	540	803	700	300
EQUIPMENT ASSEMBLY	600		—	—	—	600
MISCELLANEOUS	250	50	50	50	50	50
TOTAL	13 125	434	[illegible]	3 115	[illegible]	2 640
UNIDO	[illegible]	1982	1983	1984	1985	1986
OTHER PERSONNEL COSTS	[illegible]	2	2	2	2	—
TOTAL SUBCONTRACTS [illegible]	1511	[illegible]	[illegible]	[illegible]	493	[illegible]
STUDY TOURS	15	5	5	5	—	—
TOTAL EQUIPMENT COMPONENTS	20	5	5	10	—	—
MISCELLANEOUS	22	2	5	5	5	5
TOTAL [illegible]	1578	[illegible]	135,5	223,6	500	604,6
TOTAL T$ (x [illegible])	[illegible]	[illegible]	458	[illegible]	1630	2043,6

RECAPITULATION	TOTAL T$	1982	1983	1984	1985	1986
MONGOLIAN GOVERNMENT	13 125	434	3 123	3 115	3 770	2 640
UNIDO	5 322,7	353,5	458	776	1 630	2043,6
TOTAL	18 424,9	853,5	3581	3891	5 460	4683,6

SELECTION OF PROJECT IMPLEMENTATION
PROGRAMME AND TIME SCHEDULE

Selection of realization plan and working schedule

The realization plan, in connexion with the working schedule, must have the following consecution:

- hydrogeological prospecting
- altimetric and planimetric survey
- building plan
- preparation of building site

The construction work proper will start with the construction of water piping, gas piping, steam piping, electricity cable lines, canalization, and roadway connexion. The realization of this work is planned for 1983 /E-102 to E-107/.

The buildings are designed so that analogous construction technology will serve for all three of them. Underground work is excluded. Completely assembled structures are envisaged. The heights of the individual floors and the total height of the highest building allow a maximal use of construction mechanization.

The character of the machinery equipment, its presumptive dimensions, and the interconnexion of the individual technological units allow successive assembling.

A characteristic process of pilot-plant construction should follow a line with preference of the building B-109. Then the working schedule would proceed as follows:

- foundations - B-109
- foundations - B-110
  structure assembling B-109
- foundations - B-111
  structure assembling B-109
  structure assembling B-110
- other carcassing work B-109
  structure assembling B-110
  structure assembling B-111
- other carcassing work B-109
  and
  other carcassing work B-110
  structure assembly B-111
- auxiliary construction work B-109
  other carcassing work B-110
  other carcassing work B-111
- auxiliary construction work B-109
  auxiliary construction work B-110
  other carcassing work B-111

- readiness for machinery equipment assembling B-109
  auxiliary construction work B-110
  auxiliary construction work B-111
- machinery equipment assembling in B-109
  readiness for machinery equipment assembling B-110
  auxiliary construction work B-111
- machinery equipment assembling in B-109
  machinery equipment assembling in B-110
  readiness for machinery equipment assembling B-111
- finish of machinery equipment assembling in B-109
  machinery equipment assembling in B-110
  machinery equipment assembling in B-111
- finish of machinery equipment assembling in B-110
  machinery equipment assembling in B-111
- finish of machinery equipment assembling in B-111

From the specified phases of construction it is evident that individual groups of trained workers successively pass over from B-109 to B-111 and carry out solely basic operations which they had perfectly mastered. This flow working schedule is demanded with respect to the preparation of work and materials, but the progression of the operations is accelerated and facilitated.

The assembling of machinery equipment must start in B-109, where the volume of equipment and assembling work is largest.

Key and decisive terms of pilot-plant construction

- start of pilot-plant construction B-101, B-102, B-103, B-104, B-105, B-106, B-107, B-109	May 1983
- start of construction B-110 and B-111	October 1983
- making B-109 ready for machinery equipment assembling	June 1984
- making B-110 ready for machinery equipment assembling	January 1985
- start of conctruction B-108	June 1985
- making B-111 ready for machinery equipment assembling	June 1985
- trial operation	June 1986
- full operation	December 198[illegible]

COST ESTIMATE OF PROJECT
IMPLEMENTATION

Estimation of project realization costs

In the case of the operations carried out in the course of the investment phase up to the moment of the start of full production operation, the costs have to be estimated of the following items:

- projecting work
- authors' supervisory activity
- inspection activity
- administration of building and construction management
- fees for approval procedures
- training of staff and labourers

The financial means for covering the costs of

- the building site
- technological equipment
- building and construction work
- machinery and equipment
- materials
- raw material
- overhead costs

are specified in pertinent foregoing chapters.

SCHEDULE 9-1

ESTIMATE OF INVESTMENT COSTS - PROJECT IMPLEMENTATION

ESTIMATE OF INVESTMENT COSTS

PROJECT IMPLEMENTATION

			ITEM DESCRIPTION		UNIT COST	COST FOREIGN Tg	COST LOCAL Tg	COST TOTAL Tg
1			REALIZATION OF PROJECT				450000,-	450000,-
2			SUPPORT PERSONEL			27040,-	1287000,-	1314040,-
3			EMPLOYEE'S SCHOOLING			1713660,-		1713660,-
4			STUDY TOURS			50700,-		50700,-
5			TOTAL EQUIPMENT COMPONENT			67600,-		67600,-
6						74360,-	250000,-	324360,-
			TOTAL			1,933360,-	1,987000,-	3,920360,-

[illegible]

CHAPTER X. FINANCIAL AND ECONOMIC EVALUATION

CONTENTS :

PROJECT FINANCING

The financing of the project, as already stated in the preceding chapters, is shared by

- the UNDP/UNIDO Office Vienna
- the Mongolian Government

The UNIDO sources are generally known and need no commentary.

The sources of the Mongolian Government issue from the planned state budget, based in turn on successive five-year plans.

The Mongolian Republic is a rapidly developing socialist agricultural country. Banking in Mongolia is exlusively owned and controlled by the state. The general and particular characteristics of the calculations included in Chapter X are adjusted to the system.

In the seventh five-year plan /1981-1985/ the present project is included in the Mongolian government plan. The Government's participation in financing the project was verified by the experts at the Government Committee on Economic Relations in Ulan Bator.

The system of financing being controlled centrally in Mongolia, some items are omitted from the appropriate schedules included in the Manual for the Preparation of Industrial Feasibility Studies, UNIDO publication No. E.78.II.B.5. of 1978.

Project financing

The project is financed by the UNIDO and the Mongolian Government. The financial means have not the character of loans and are not-repayable.

Project costs

The total investment costs, 18,451.900, include the fixed investment costs and the preproduction capital expenditure. The working capital is provided annually by the Mongolian Government.

	Foreign currency	Local currency	Total
	Tg	Tg	Tg
A. Fixed investment costs			
Site preparation		809.000,-	809.000,-
Buildings		9,729.000,-	9,729.000,-
Machinery	3,393.540,-	600.000,-	3,993.540,-
Total			14,531.540,-
B. Preproduction capital expenditure			3,920.360,-
Total A + B			18,451.900,-
C. Working capital			3,389.495,-

Financial means:

Source	Fixed investment costs	Reproduction capital expenditure	Total
Total investment costs	14,531.540,-	3,920.360,-	18,451.900,-

These means will be drawn in the course of the construction period as follows:

Expences are published in Mongolian currency /Tg/

YEAR	MONGOLIAN GOVERNMENT	UNIDO	TOTAL	%
1982	494.000,-	359.300,-	853.300,-	4,62
1983	3,106.000,-	458.000,-	3,564.000,-	19,32
1984	3,115.000,-	776.000,-	3,891.000,-	21,09
1985	3,770.000,-	1,690.000,-	5,460.000,-	29,59
1986	2,640.000,-	2,043.600,-	4,683.600,-	25,38
Total	13,125.000,-	5,326.900,-	18,451.900,-	100,00

Schedule 10-1/1

Initial fixed investment costs

Investment category	Foreign currency	Local currency	Total costs
1. Site preparation and development	-----	809 000	809 000
2. Structures and civil works	-----	9 729 000	9 729 000
a/ Buildings and civil works	-----	9 729 000	9 729 000
3. Plant machinery and equipment	3 393 540	600 000	3 993 540
4. Total initial fixed investment costs	3 393 540	11 138 000	14 531 540

SCHEDULE 10 - 1/2
FIXED INVESTMENT COSTS[a]

PERIOD	CONSTRUCTION PERIOD INITIAL FIXED INVESTMENT															START-UPAND FULL CAPACITY UTILIZATION			TOTAL		
YEAR	1			2			3			4			5								
	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt
FIXED INVESTMENT COSTS	156782	514576	671358	655632	2151862	2807494	715698	2349004	3064702	1004148	3295734	4299882	861280	2826824	3688104				3393540	11138000	14531540
1. SITE PREPARATION AND DEVELOPMENT	—	37376	37376	—	156299	156299	—	170618	170618	—	239383	239383	—	205324	205324				—	809000	809000
2. STRUCTURES AND CIVIL WORK	—	449480	449480	—	1879643	1879643	—	2051846	2051846	—	2878811	2878811	—	2469220	2469220				—	9729000	9729000
3. PLANT AND MACHINERY	156782	27720	184502	655632	115920	771552	715698	126540	842238	1004148	177540	1181688	861280	152280	1013560				3393540	600000	3993540

NOTE : FC = FOREIGN CURRENCY , LC = LOCAL CURRENCY , Tt = TOTAL

Schedule 10-2/1

Pre-production capital expenditures, by category

	Category	From table	Foreign currency Tg	Local currency Tg	Total Tg
1.	Pre-investment studies	2-1	(134 750)	-----	(134 750)
2.	[illegible]ratory [illegible]ations	2-1	-----	(170 000)	(170 000)
3.	Management of project implementation	9-1	-----	450 000	450 000
4.	Supervision, co-ordination, test-run and take-over of civil works, equipment and plant	9-1	94 640	1 287 000	1 381 640
5.	Build-up of administration recruitment and training of staff and labour	9-1	1 764 360	-----	1 764 360
6.	Miscellaneous	9-1	74 360	250 000	324 360
	Total		1 933 360	1 987 000	3 920 360

1. UNIDO - (134 750 Tg) - 1981

2. Mongolian government - (170 000 Tg) - 1981

SCHEDULE 10 - 2/2
PREPRODUCTION CAPITAL EXPENDITURE, BY YEAR

PERIOD	CONSTRUCTION PERIOD															STARTUP AND FULL CAPACITY					
YEAR	1			2			3			4			5			.	.	.	TOTAL		
PREPRODUCTION CAPITAL EXPENDITURE	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt
	89321	91799	181120	373525	383888	757413	407746	419059	826805	572081	587953	1160034	490687	504301	994988				1933360	1987000	3920360

NOTE: FC = FOREIGN CURRENCY, LC = LOCAL CURRENCY, Tt = TOTAL

TOTAL PRODUCTION COSTS

With due regard to the character of the present project, formulated in Chapter II of this study, the Chapter X is elaborated in accordance with the guidelines set in the Manual for the Preparation of Industrial Feasibility Studies, UNIDO publication No.E.78.II.B.5 of 1978.

The essential data given below lead to the following conclusions:

1/ The annual rate of profit from the equity capital grows from 13.12% in the first year of production to 28.70% in the year of expected 100% production capacity:

Construction	Start-up and full production					
Year 1 2 3 4 5	6	7	8	9	10	11
Net profit after tax	2421272	3837096	5004411	5295121	5295121	5295121
Equity capital	18451900	18451900	18451900	18451900	18451900	18451900
Rate of profit%	13,12	20,80	27,12	28,70	28,70	28,70

2/ The initial investment costs, ie, 18,451.900,-Tg, will be paid back within less than 9 years from the start of construction /calculation of rate of return of the project/:

Year	Net profit	Depreciation	Amount paid back	Balance
1	----	----	----	18,451.900,-
2	----	----	----	- " -
3	----	----	----	- " -
4	----	----	----	- " -
5	----	----	----	- " -
6	2,421.272,-	698.200,-	3,119.472,-	15,332.428,-
7	3,837.096,-	698.200,-	4,535.296,-	10,797.132,-
8	5,004.411,-	698.200,-	5,702.611,-	5,094.521,-
9	5,295.121,-	698.200,-	5,993.321,-	----
10	5,295.121,-	698.200,-	5,993.321,-	----

3/ The simple rate of profit in the 9th year after the start of construction /production with 100% capacity/ will be:

$$R_e = \frac{\text{net profit}}{\text{equity capital}} \times 100 = \frac{5,255.121}{18,451.900} \times 100 = 28.70\%$$

4/ The rate of return of the project in the 9th year after the start of construction will be:

$$\frac{\text{net profit}}{\text{total investment outlay}} \times 100 = \frac{5,295.121}{10,626.517} \times 100 = 49.83\%$$

Schedule 10-3/1

Calculation of working capital

I. Minimum requirements of current assets and liabilities

a/ Accounts receivable : 30 days at production costs minus depreciation and interests

b/ Inventory :

Local material : 180 days

Imported material : 12[illegible] days

Spare parts : 180 days

Work in progress : 20 days at factory c[illegible]

Finished products : 20 days at [illegible] plus [illegible] overheads

c/ Cash in hand : 15 days (see separate calculation at the bottom of schedule 10-3/2)

d/ Accounts payable : 30 days (for raw materials and utilities)

II. ANNUAL PRODUCTION - COST ESTIMATE

PERIOD	CONSTRUCTION	START - UP	
YEAR	1 - 5	6	7
PRODUCTION PROGRAMME	0	50 %	75 %
RAW MATERIALS : LOCAL MATERIAL	-	1218008	1921512
IMPORTED MATERIAL	-	1075413	1613119
LABOUR	-	414876,2	622314,2
UTILITIES	-	1505007	2257511
MAINTENANCE -SPARE PARTS	-	33800	50700
FACTORY OVERHEAD COSTS	-	709885	709885,
FACTORY COSTS	-	4956989	7175041
ADMINISTRATIVE OVERHEAD COSTS	-	598224	598224
OPERATING COSTS	-	5555213	7773265
DEPRECIATION	-	698200	698200
TOTAL PRODUCTION OR MANUFACTURING COSTS	-	6253413	8471465

	FULL CAPACITY		
8	9	10	11
95 %	100 %	100 %	100 %
2433915	2562016	2562016	2562016
2043285	2150825	2150826	2150826
788184,7	829752,3	829752,3	829752,3
2859513	3010014	3010014	3010014
64220	67600	67600	67600
709885	709885	709885	709885
8863083	9330093	9330093	9330093
598224	598224	598224	598224
9437307	9928317	9928317	9928317
[illegible]	698200	698200	698200
[illegible]	10628517	10628517	10628517

[illegible]

	X	Y	REQUIREMENTS [illegible]					
	[illegible]	[illegible] OF [illegible]	[illegible]					
			6	7	8	9	10	11
[illegible]	20	12	462924	647772	724442	827360	827360	[illegible]
[illegible]	180	2	608004	860756	1216253	[illegible]	[illegible]	[illegible]
[illegible]	199	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	160	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	20	18	[illegible]	325613	494[illegible]	518325	[illegible]	[illegible]
[illegible]S	20	13	309623	431843	527623	551573	551572	[illegible]
	15	24	72132	82964	90025	91924	[illegible]	[illegible]
[illegible]	—	—	2115345	2024122	2945193	[illegible]	[illegible]	[illegible]
[illegible]	20	12	-321523	-432673	-611292	-643571	[illegible]	[illegible]
[illegible]	—	—	1789903	[illegible]1445	3933[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	—	—	—	889026	602[illegible]	[illegible]	—	—

[illegible]

	X	Y	6	7	8	9	10	11
[illegible]								
	—	—	6253413	8471445	1085507	1026517	[illegible]	[illegible]
[illegible]	—	—	2293421	2524621	4497200	[illegible]	[illegible]	[illegible]
[illegible]	—	—	1505007	2257511	2259513	[illegible]	[illegible]	[illegible]
[illegible]	—	—	292200	692200	692200	[illegible]	[illegible]	[illegible]
	15	24	1186925	1921153	2130824	[illegible]	[illegible]	[illegible]
[illegible]	—	—	72132	82964	90025	91924	91924	91924

Schedule 10-6/1

Total initial investment costs

	Investment category	Foreign currency [illegible]	Local currency [illegible]	Total [illegible]
1.-	Initial fixed investment costs	3 393 540	11 138 000	14 531 540
2.	Pre-production capital expenditures	1 933 360	1 987 000	3 920 360
3.	Working capital (at full capacity)	-----	3 389 495	3 389 495
	Total	5 326 900	16 514 495	21 841 395

APPENDIX X

PAGE 17

CONSTRUCTION

TOTAL

Schedule 10-7/1
Total initial assets

	Investment category	Foreign currency	Local currency	Total
1.	Initial fixed investment costs	3 393 540	11 138 000	14 531 540
2.	Pre-production capital expenditures	1 933 360	1 987 000	3 920 360
3.	Current assets (at full capacity)	-----	4 033 066	4 033 066
	Total	5 326 900	17 158 066	22 484 966

S[illegible] [illegible] 10 - 7/2

T[illegible] ASSETS

PERIOD	CONSTRUCTION															START-UP AND FULL PRODUCTION				TOTAL		
YEAR	1			2			3			4			5			6	7.	8	9			
	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt	FC	LC	Tt	Tt	Tt	Tt	Tt	FC	LC	Tt
1 FIXED INVESTMENT COSTS	156782	514576	671358	655632	2151862	2807494	715698	2349[illegible]	3054702	1004143	3295734	4299[illegible]	56280	2306834	3589104					3373540	11138000	14511540
2) INITIAL FIXED INVESTMENT COSTS	156782	514576	671358	655632	2151862	2807494	715698	2349[illegible]	3054702	1004143	3295734	4299[illegible]	56280	2306834	3589104					3373540	11138000	14511540
2. PRE-PRODUCTION CAPITAL EXPENDITURES	83321	91799	181120	373525	383885	757410	407745	412659	820805	570081	587153	1157234	490587	504301	994888					1933[illegible]	1987001	3920360
3. CURRENT ASSETS INCREASE	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2110595	963528	751073	187870		4033[illegible]	4033066
TOTAL ASSETS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3564[illegible]	1123444	2758[illegible]	3871507	1575229	3883657	5453[illegible]	1351967	3331125	4583092	2110595	963528	751073	187870	5306[illegible]	[illegible]	[illegible]

[illegible] FC = FOREIGN CURRENCY, LC = LOCAL CURRENCY, Tt = TOTAL

Schedule 10-8/1

Sources of finance

Item	Sources of finance	Local currency ₮	Foreign currency ₮	Total ₮
1.	Promoters (Mongolia) a/ Equity	13 125000	-----	13 125000
2.	Financial institutions or development agencies (UNIDO)	-----	5 326900	5 326900
	Total, all items	13 125000	5 326900	18 451900

SCHEDULE 10 - 6/2
SOURCES OF INITIAL FUNDS

PERIOD	CONSTRUCTION															PRODUCTION	TOTAL		
YEAR	1			2			3			4			5			....			
	FC	LC	Tl	FC	LC	Tl	FC	LC	Tl	FC	LC	Tl	FC	LC	Tl		FC	LC	Tl
EQUITY CAPITAL	359300	443178	652478	458000	3106907	3564907	770000	3115507	3891507	1690000	3769915	5459915	2043000	2639492	4683042		5326900	13125000	18451900
TOTAL	359300	443178	652478	458000	3106907	[illegible]	[illegible]	[illegible]	3891507	[illegible]	3769915	[illegible]	2043000	2639492	4683042		5326900	13125000	18451900

NOTE : FC = FOREIGN CURRENCY, LC = LOCAL CURRENCY, Tl = TOTAL

SCHEDULE 10-8/3

CASH-FLOW TABLE FOR FINANCIAL PLANNING

PERIOD	CONSTRUCTION					START-UP AND FULL CAPACITY						SALVAGE VALUE IN LAST YEAR	TOTAL
YEAR	1	2	3	4	5	6	7	8	9	10	11		
PRODUCTION PROGRAMME (FROM SCHEDULE 3-3)	0	0	0	0	0	50%	75%	95%	100%	100%	100%		
A CASH INFLOW	852498	3564907	3891507	545[illegible]	4683092	15738500	[illegible]	30213150	31807000	31807000	31807000	—	[illegible]
1 FINANCIAL RESOURCES TOTAL	852498	3564907	3891507	545[illegible]	4683092	—	—	—	—	—	—	—	1845[illegible]
2 SALES REVENUE	—	—	—		—	15738500	[illegible]	30213150	31807000	31807000	31807000	—	[illegible]
B CASH OUTFLOW	[illegible]	3564907	[illegible]	545[illegible]	[illegible]3092	[illegible]	[illegible]	25207612	[illegible]	25913879	[illegible]	[illegible]	[illegible]
1 TOTAL ASSETS SCHEDULE INCLUDING REPLACEMENTS	-852498	[illegible]	-3891507	-545[illegible]	-4683092	-2105[illegible]	[illegible]	-751073	-187870	—	—	19324444	-3[illegible]
2 OPERATING COSTS	—	—	—	—	—	-5555213	[illegible]	-9497307	-9923317	-9928317	-9928317	—	[illegible]
3 CORPORATE TAXES	—	—	—	—	—	-7263515	[illegible]	-15013232	-15855362	-15855362	-15855362	—	-81444[illegible]
C SURPLUS/DEFICIT	0	0	0	0	0	1008877	3551[illegible]	4951538	5805451	5993321	5993321	19324444	—
D CUMULATIVE CASH BALANCE	0	0	0	0	0	1008877	[illegible]	9512183	15317634	21310955	27304276	46[illegible]28720	[illegible]

FINAL EVALUATION

T-UP AND FULL CAPACITY

7	8	9	10	11
75%	95%	100%	100%	100%
[illegible]1850	30213150	31[illegible]000	31807000	31807000
[illegible]71465	101[illegible]07	10[illegible]6517	10[illegible]6517	10626517
[illegible]48395	20017513	211[illegible]483	211[illegible]483	21130483
[illegible]511297	150132 32	15[illegible]5362	15[illegible]	15[illegible]
[illegible]37096	50044711	5295121	5295121	5295121
[illegible]39095	50044711	5[illegible]121	5295121	5295121
[illegible]59368	11262779	1[illegible]400	21853021	27148142
[illegible]4,44	66,25	[illegible],59	66,59	66,59
[illegible],11	15,[illegible]	1[illegible]	15,65	16,65
[illegible]0	21,12	2[illegible],70	[illegible]	23,10

PAGE

SCHEDULE 10-9

NET INCOME STATEMENT

PERIOD	[illegible]	STA[illegible]	
YEAR	1-5	6	
PRODUCTION PROGRAMME	0	50%	
1. SALES	—	15938500	23[illegible]
2. PRODUCTION COSTS	—	8253413	[illegible]
3. GROSS OR TAXABLE PROFIT (1-2)	—	9685087	15[illegible]
4. TAX (75%)	—	7263815	115[illegible]
5. NET PROFIT (3-4)	—	2421272	33[illegible]
7. UNDISTRIBUTED PROFITS	—	2421272	33[illegible]
8. ACCUMULATED UNDISTRIBUTED PROFITS	—	2421272	[illegible]
RATIOS			
GROSS PROFIT: SALES (%)	—	60,77	
NET PROFIT: SALES (%)	—	15,17	
NET PROFIT: EQUITY (%)	—	13,12	

TABLE 10-10.

PROJECTED BALANCE SHEET

PERIOD	CONSTRUCTION					START-UP AND FULL CAPACITY					
YEAR	1	2	3	4	5	6	7	8	9	10	11
1. ASSETS (TOTAL)	852478	4417885	8308892	16758808	18451900	20878112	[illegible]	27914679	35007800	40801921	45600042
2. CURRENT ASSETS (TOTAL) CUMULATIVE						3119472	[illegible]	[illegible]	19050700	[illegible]	31327842
4. CASH BALANCE						1008677	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5. CURRENT ASSETS						2110535	[illegible]	[illegible]	[illegible]	[illegible]	4033056
FIXED ASSETS NET OF DEPRECIATION	852478	4417885	8308892	[illegible]	18451900	17753700	17055500	16357300	15659100	14960900	14262700
TOTAL FIXED INVESTMENT, EQUIPMENT AND PRODUCTION CAPITAL EXPENDITURES	852478	4417885	8308892	16758808	18451900	17753700	17055500	16357300	15659100	14960900	14262700
LIABILITIES (TOTAL)	852478	4417885	8308892	[illegible]	18451900	20878112	[illegible]	27914679	[illegible]	[illegible]	45600042
EQUITY CAPITAL	852478	4417885	8308892	16758808	18451900	18451900	18451900	18451900	18451900	18451900	18451900
RESERVES						[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	27148142

Schedule 10-11
Total production costs[a] (see also schedule 10-3/1)

Cost item	Foreign currency	Local currency	Total
	[illegible]	[illegible]	[illegible]
1. Direct materials and inputs	-----	4 712 842	4 712 842
2. Direct manpower: labour and staff	-----	829 752	829 752
3. Factory overhead costs			
3.1. Manpower costs	-----	694 885	694 885
3.2. Overhead materials	-----	3 010 014	3 010 014
3.3. Other factory overheads	-----	82 600	82 600
FACTORY COSTS	-----	9 330 033	9 330 033
4. Administrative overhead costs			
4.1. Manpower costs	-----	523 224	523 224
4.2. Other administrative overheads	-----	75 000	75 000
OPERATING COSTS	-----	9 928 317	9 928 317
5. Depreciation	-------	698 200	698 200
TOTAL PRODUCTION OR MANUFACTURING COSTS	-----	10 626 517	10 626 517

[a] At full capacity year 9

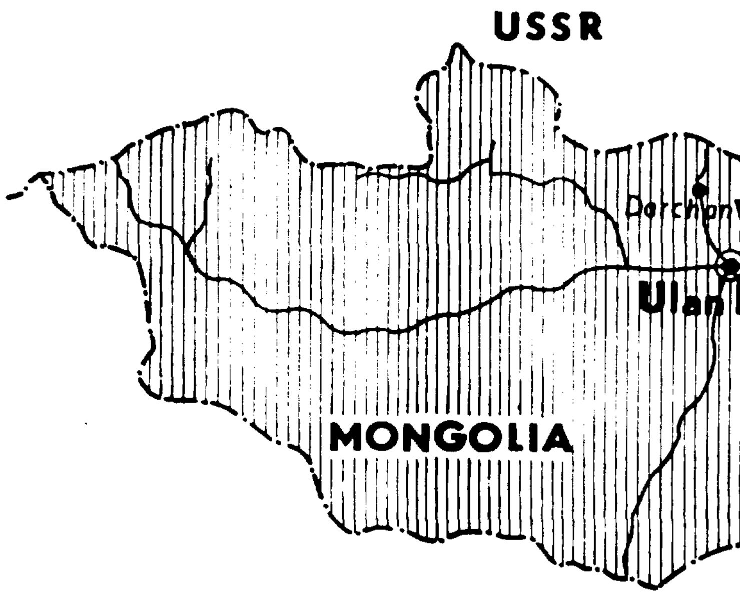
SCHEDULE 10.12
PRODUCTION-COST SCHEDULE (SEE ALSO SCHEDULE [illegible])

PERIOD	START-UP			FULL CAPACITY OPERATION		
YEAR	6	7	8	9	10	11
PRODUC.PROGRAMME	50%	75%	95%	100%	100%	100%
	LC = Tt	LC = Tt	LC = Tt	LC = Tt	LC = Tt	LC = Tt
1. DIRECT MATER.	2293421	3534632	4477200	4712842	4712842	4712842
2. DIRECT MANPOWER	414876	622314	788264	829752	829752	829752
3. FACTORY OVERH.	2248692	3073095	3633618	3787499	3787499	3787499
FACTORY COST	4955989	7175041	8899083	9330093	9330093	9330093
4. ADMINISTR. COSTS	598224	598224	598224	598224	598224	598224
OPERATING COSTS	5555213	7773265	9497307	9928317	9928317	9928317
5. DEPRECIATION	698200	698200	698200	698200	698200	698200
TOTAL PROD. COSTS	6253413	8471465	10195307	10626517	10626517	10626517

SCHEDULE 10-13
CASH-FLOW TABLE

PERIOD	CONSTRUCTION					START-UP AND FULL CAPACITY						SALVAGE VALUE IN LAST YEAR	TOTAL
YEAR	1	2	3	4	5	6	7	8	9	10	11		
PRODUCTION CAPACITY	0	0	0	0	0	50%	75%	[illegible]	100%	100%	100%		
A CASH INFLOW 1. SALES REVENUE	0	0	0	0	0	15128500	22819350	[illegible]	[illegible]	[illegible]	31907000	—	155792000
B CASH OUTFLOW (1+2+3)	852478	3564907	3391507	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	22812679	[illegible]	105572109
1 TOTAL INVESTMENT OUTLAY	852478	3564907	3391507	[illegible]	[illegible]	1788609	[illegible]	[illegible]	[illegible]	—	—	[illegible]	[illegible]
2 OPERATING COSTS	—	—	—	—	—	5555213	7773265	[illegible]	9928317	9928317	9928317	—	[illegible]
3 CORPORATE TAX	—	—	—	—	—	7763515	11511289	[illegible]	[illegible]	15885762	15885762	—	91444422
C NET CASH FLOW (A-B)	852478	[illegible]	[illegible]	[illegible]	[illegible]	1206663	[illegible]	[illegible]	[illegible]	5913321	5993321	19334444	28830341
E CUMULATIVE NET CASH FLOW	852478	[illegible]	5706892	[illegible]	[illegible]	17121237	[illegible]	[illegible]	24906875	[illegible]	9495147	—	28830341

CENTRAL ASIAN AREA WITH OUTLINE OF MONGOLIA AND LOCALIZATION OF ULAN BATOR



0 300 600 1 : 15,000 000

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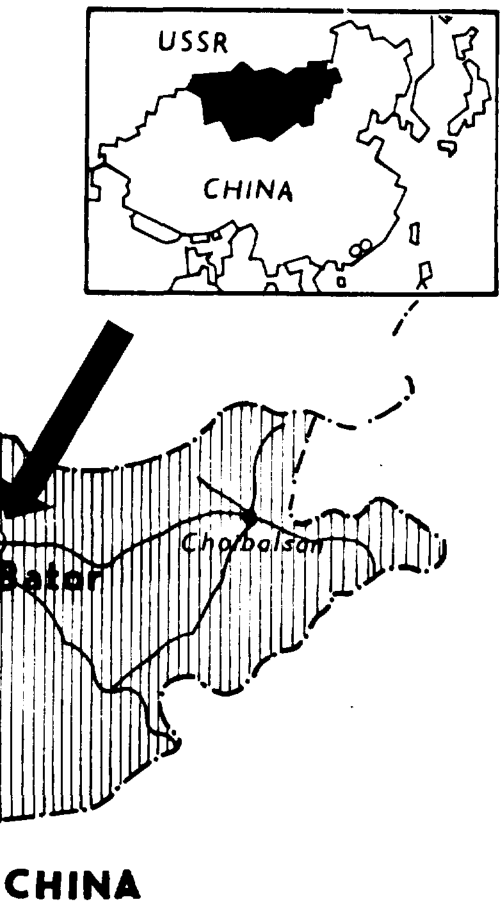
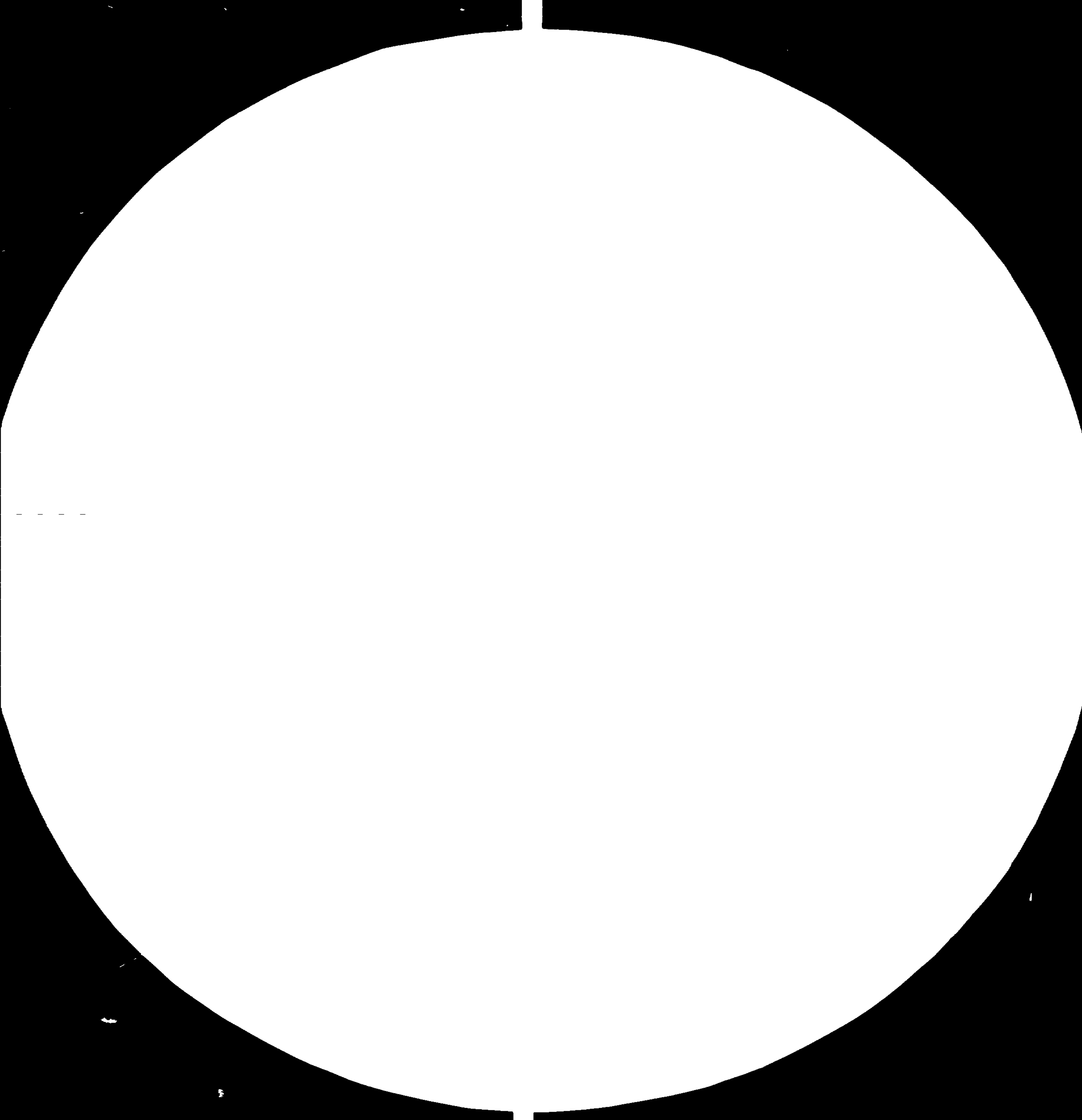
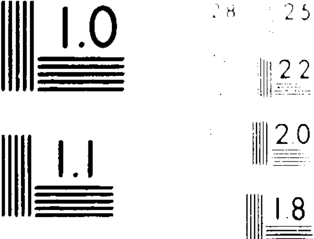


FIG. 1

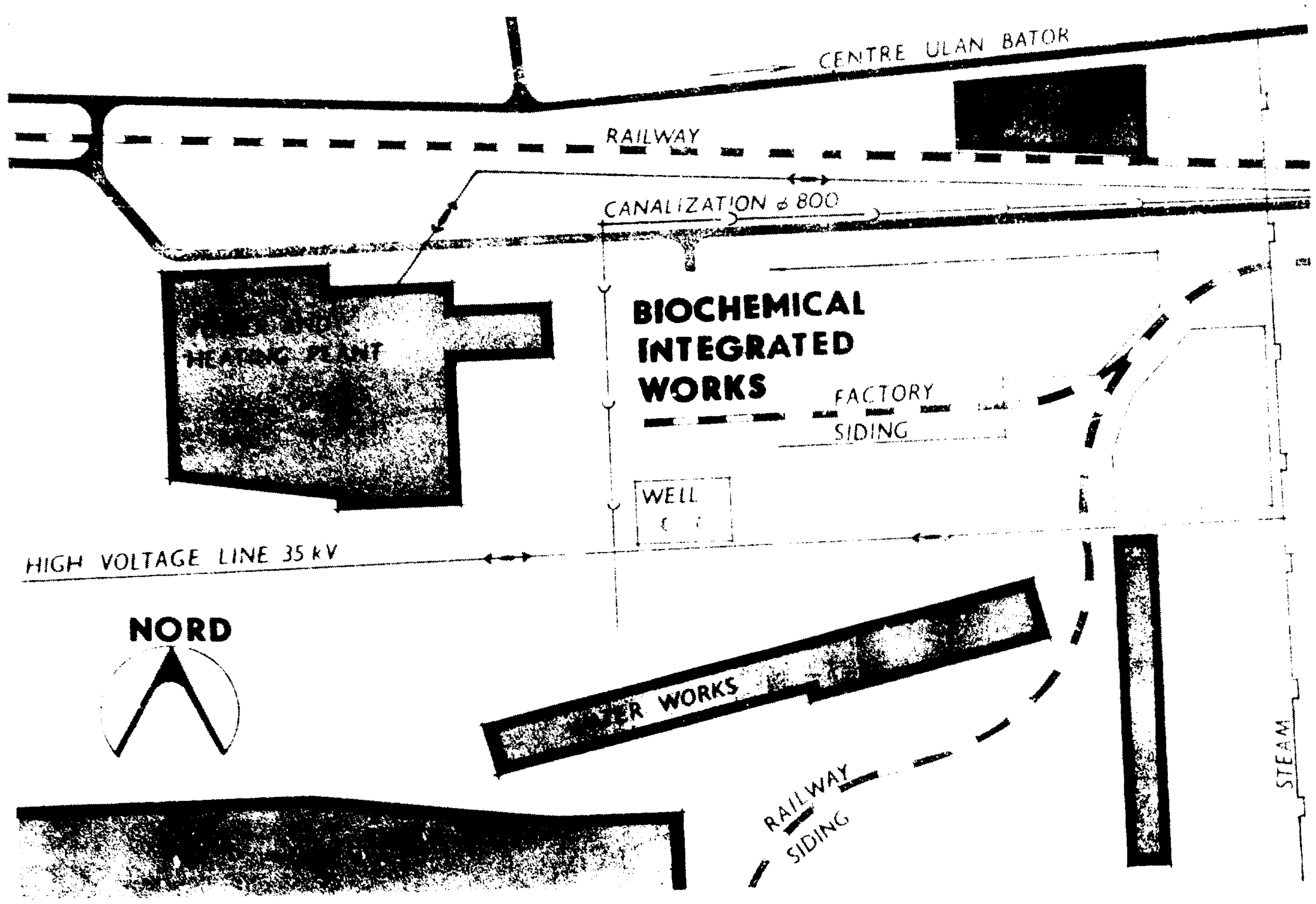




1.0
1.1
2.5
2.2
2.0
1.8

1.25 1.4 1.6

DETAIL OF LOCALIZATION OF ULAN BATOR



1 : 10 000

FIG. II

SOME FIGURES
OF THIS DOCUMENT
ARE TOO LARGE
FOR MICROFICHING
AND WILL NOT
BE PHOTOGRAPHED.

PILOT PLANT - GROUND FLOOR ± 0

/ANNEX TO FIG.IV/

01 - LIFT

02 - STAIRCASE

03 - TRAFO

04 - COMPRESSED AIR STATION

05 - COOLED STORE

06 - THAWING PLACE

07 - ORGANIC SOLVENTS PUMP-STATION

08 - LIFT

09 - STAIRCASE

010 - WC

011 - STORE

012 - COOLING MACHINERY

013 - PASSAGE

014 - COOLING MACHINERY

015 - MACHINERY ROOM FOR STEAM AND HOT WATER PREPARATION

016 - STORE KEEPER

017 - CHEMICAL STORE

018 - TUBES AND VIALS WASHING

019 - SUBSTANCES, PACKING MATERIAL, GLASS-WARE

020 - FINAL PRODUCTS STORE

021 - VESTIBULE /HALL/

022 - AKUBATTERIES

023 - CHARGING

024 - EXPEDITION

025 - WC

026 - LIFT

027 - STAIRCASE

028 - PLATFORM

029 - WC

030 - SLOAC - ROOM

031 - LAVATORY

032 - LAVATORY

033 - SLOAC - ROOM

034 - WC

035 - STORE

036 - STORE

037 - MAINTENANCE WORKSHOP

038 - LIME STORE

039 - NEUTRALIZATION POINT STATION

PILOT PLANT - FLOOR +4,20

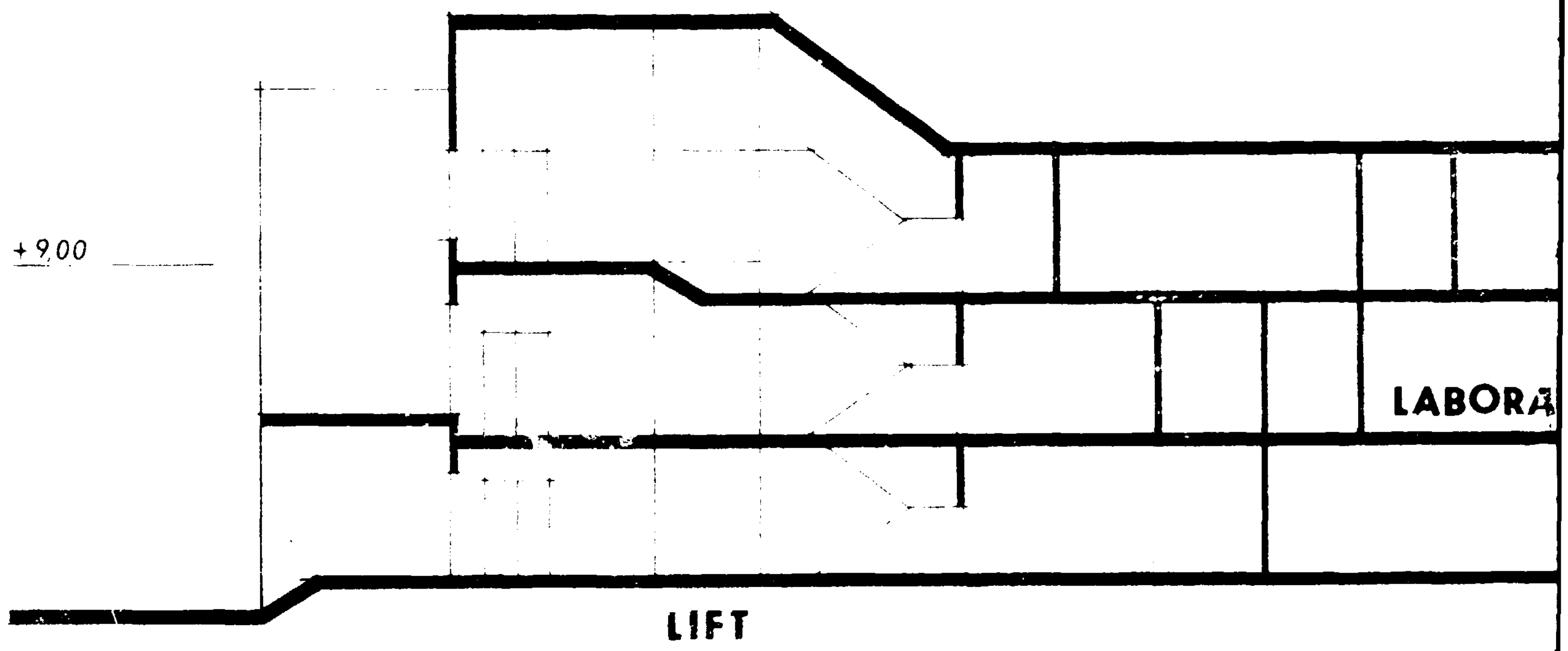
/ANNEX TO FIG.V/

101 - LIFT
102 - STAIRCASE
103 - ELECTRICITY POINT
104 - AIR CONDITIONER
105 - BIOCHEMICAL PRODUCTION
106 - LIFT
107 - WC
108 - STAIRCASE
109 - FOREMAN
110 - STORE
111 - COOLING BOX
112 - COOLING BOX
113 - INTER STORE
114 - TABLETS
115 - TABLETS
116 - PACKING
117 - WC
118 - LIFT
119 - STAIRCASE
120 - PACKING
121 - STERILE PRODUCTION
122 - SANITARY PASSAGE
123 - SOLUTION PREPARATION
124 - FOREMAN
125 - PREPA ATION OF ECTAS
126 - STERILE BOX
127 - SANITARY PASSAGE
128 - INCUBATORS
129 - LIQUIDATION OF INCUBATORS
130 - COOLING BOX
131 - SAMPLES
132 - COOLING BOX
133 - OFFICE
134 - OFFICE
135 - WC
136 - INPURIFIED GLASS-WARE
137 - SCULLERY
138 - PURE GLASS-WARE
139 - CHEMICAL GLASS STORE
140 - STUDY ROOM
141 - STUDY ROOM
142 - BIOCHEMICAL LABORATORY
143 - CHEMICAL LABORATORY
144 - WEIGHTING ROOM
145 - APPARATUSES STORE
146 - ANALYTICAL PHYSICAL LABORATORY

PILOT PLANT - FLOOR +8,40 /+90C/

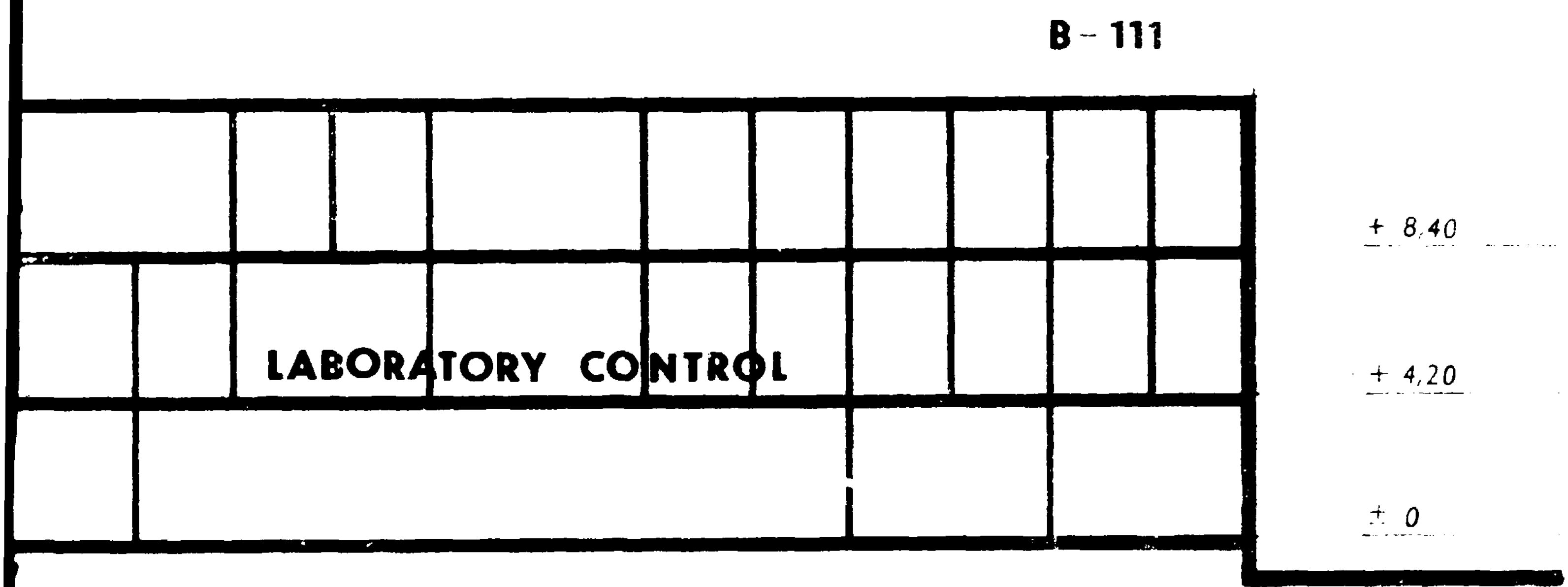
/ANNEX TO FIG.VI/

201 - LIFT
202 - STAIRCASE
203 - ELECTRICITY POINT
204 - AIR CONDITIONER
205 - BIOCHEMICAL PRODUCTION
206 - LIFT
207 - WC
208 - STAIRCASE
209 - FOREMAN
210 - STORE
211 - DEMI WATER
212 - LABORATORY CHIEF'S OFFICE
213 - SECRETARIAT
214 - OFFICE
215 - BIOCHEMICAL DEPT.
216 - VIVARIUM WITH THERMOSTATS
217 - VIVARIUM WITH THERMOSTATS
218 - BACTERIOLOGICAL DEPT.
219 - CHEMICAL DEPT.
220 - VIVARIUM WITH THERMOSTATS
221 - WC
222 - OFFICE
223 - OFFICE
224 - OFFICE
225 - OFFICE
226 - OFFICE
227 - STUDY ROOM
228 - LIBRARY
229 - PILOT PLANT CHIEF'S OFFICE
230 - SECRETARIAT
231 - REST ROOM
232 - KITCHEN



SECTION 1

SECTIO



SECTION 2

SECTIONAL VIEW II - II'

FIG. VIII

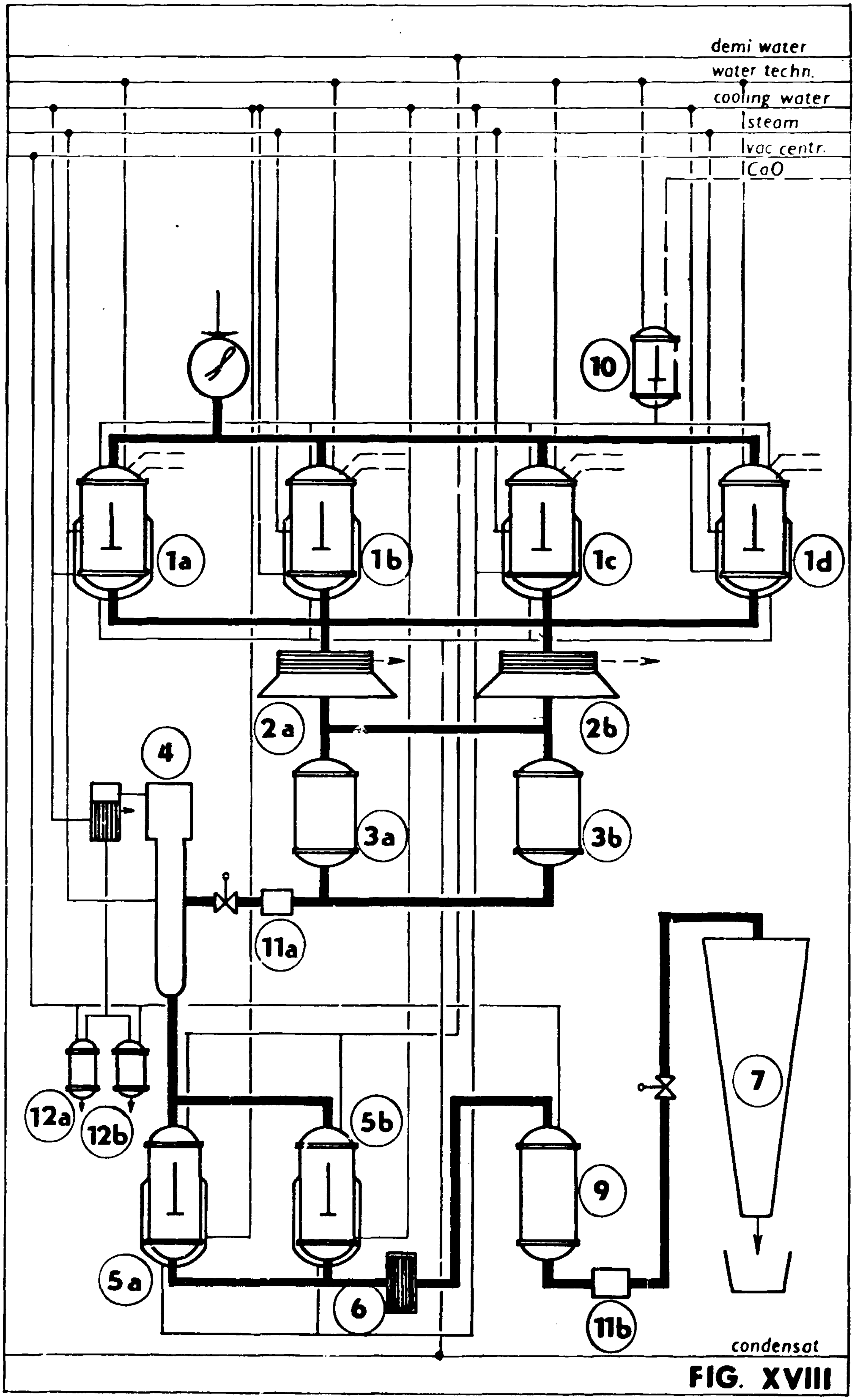

demi water
water techn.
cooling water
steam
vac centr.
CaO
10
1a
1b
1c
1d
2a
2b
4
3a
3b
11a
7
12a
12b
5b
5a
9
6
11b
condensat

FIG. XVIII

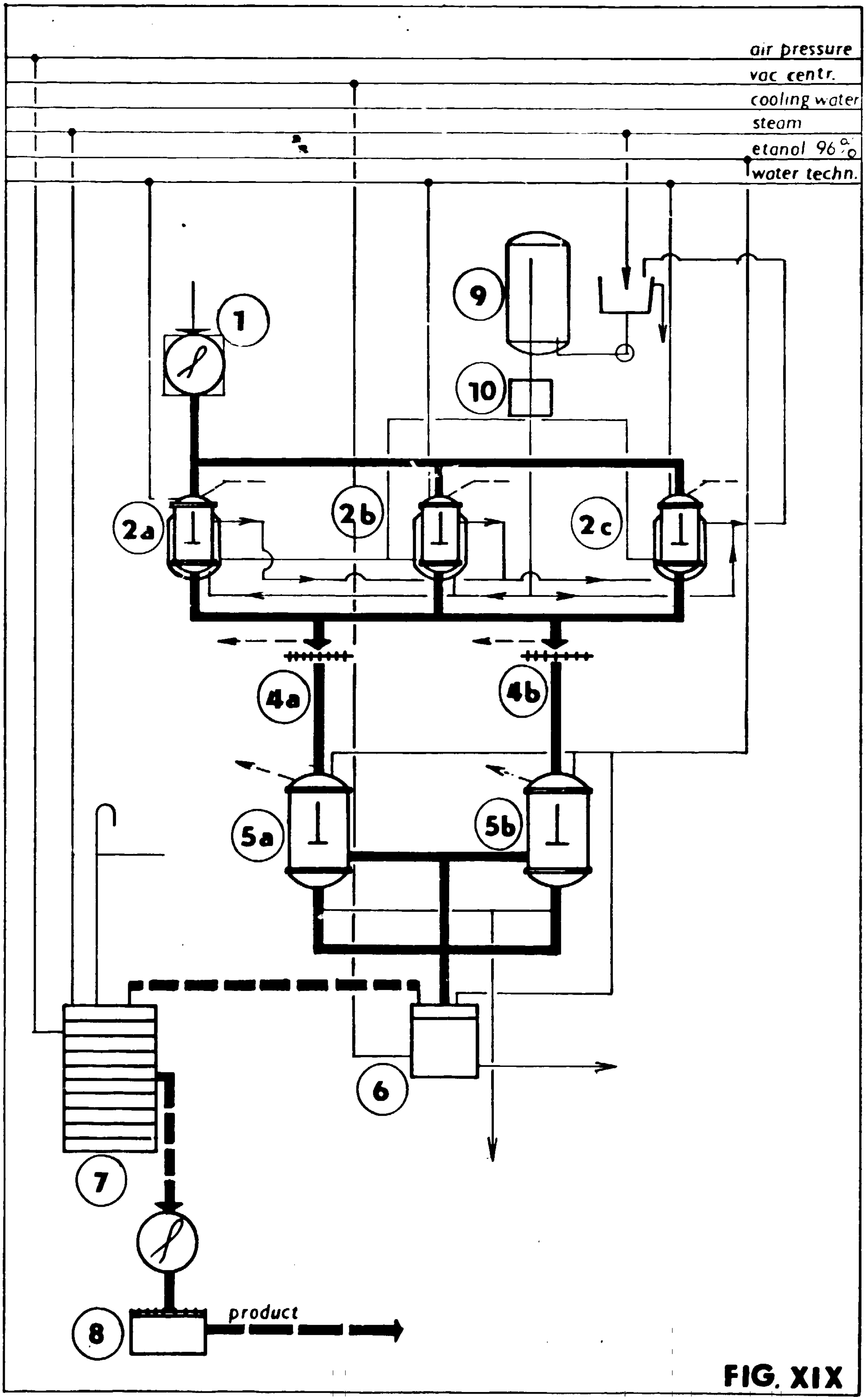

air pressure
vac centr.
cooling water
steam
etanol 96 %
water techn.
1
2a
2b
2c
4a
4b
5a
5b
6
7
8
9
10
product

FIG. XIX

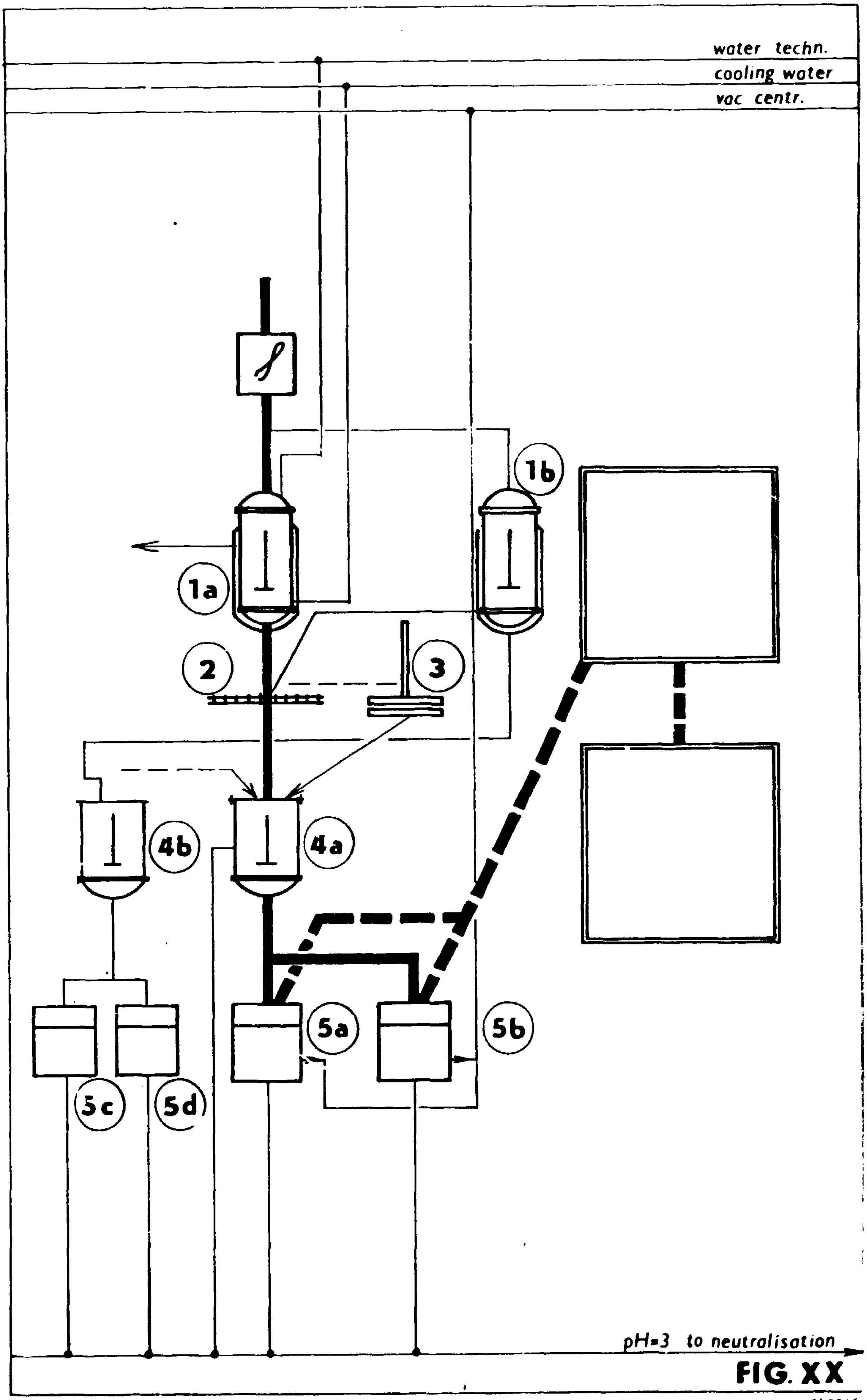

water techn.
cooling water
vac centr.
1a
1b
2
3
4a
4b
5a
5b
5c
5d
pH=3 to neutralisation

FIG. XX

2104

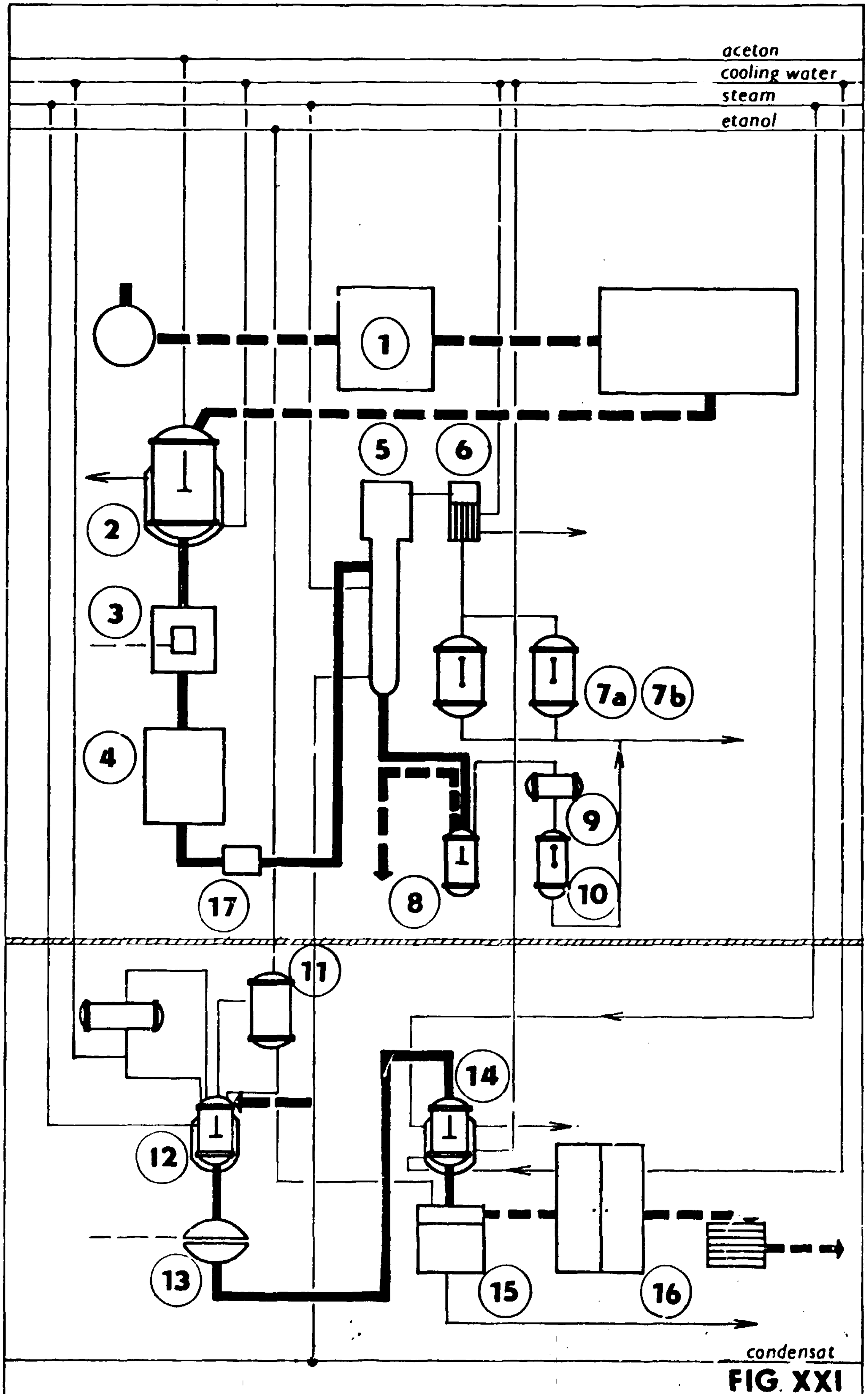

aceton
cooling water
steam
etanol
1
2
3
4
5
6
7a
7b
8
9
10
11
12
13
14
15
16
17
condensat

FIG. XXI

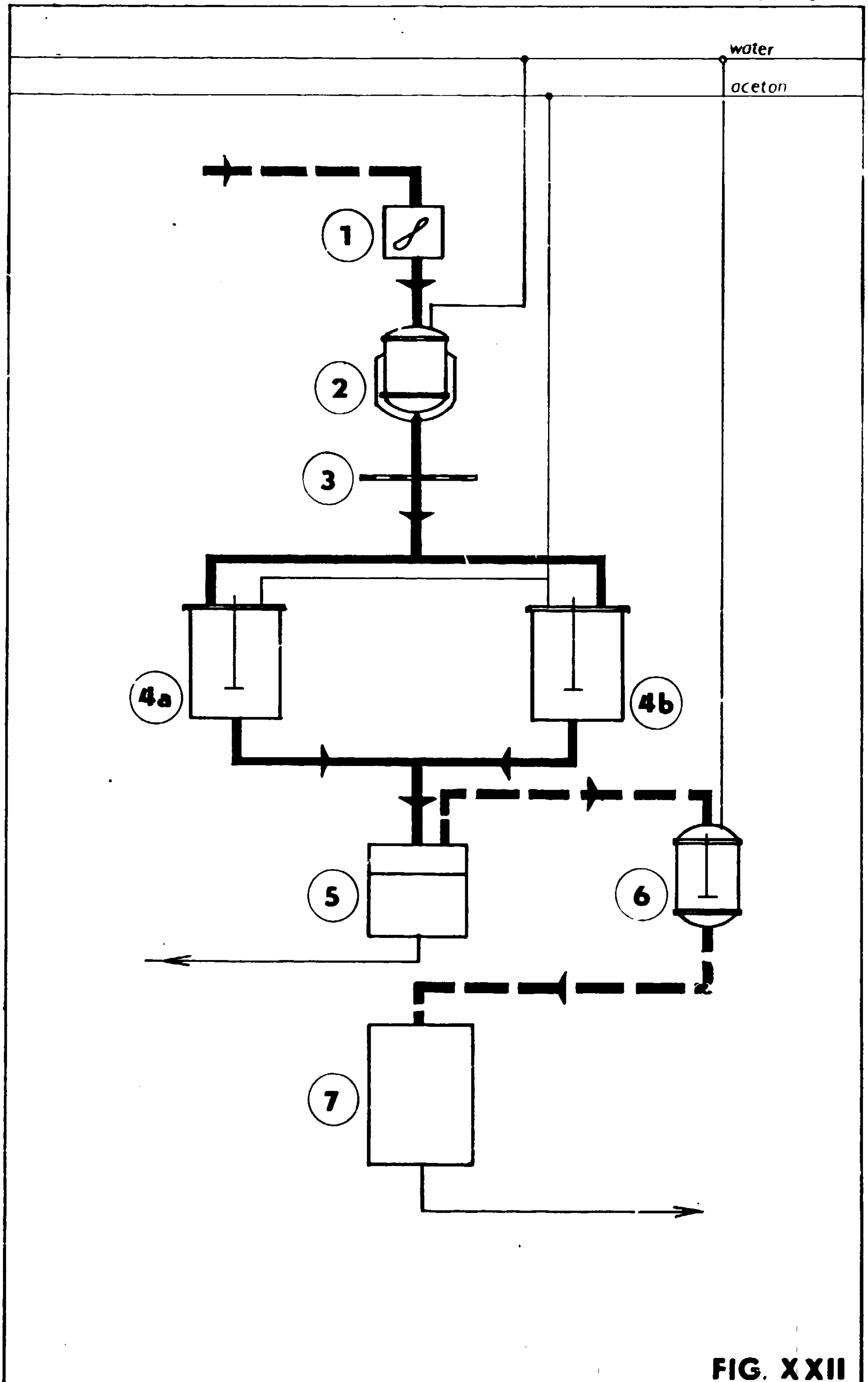


FIG. XXII

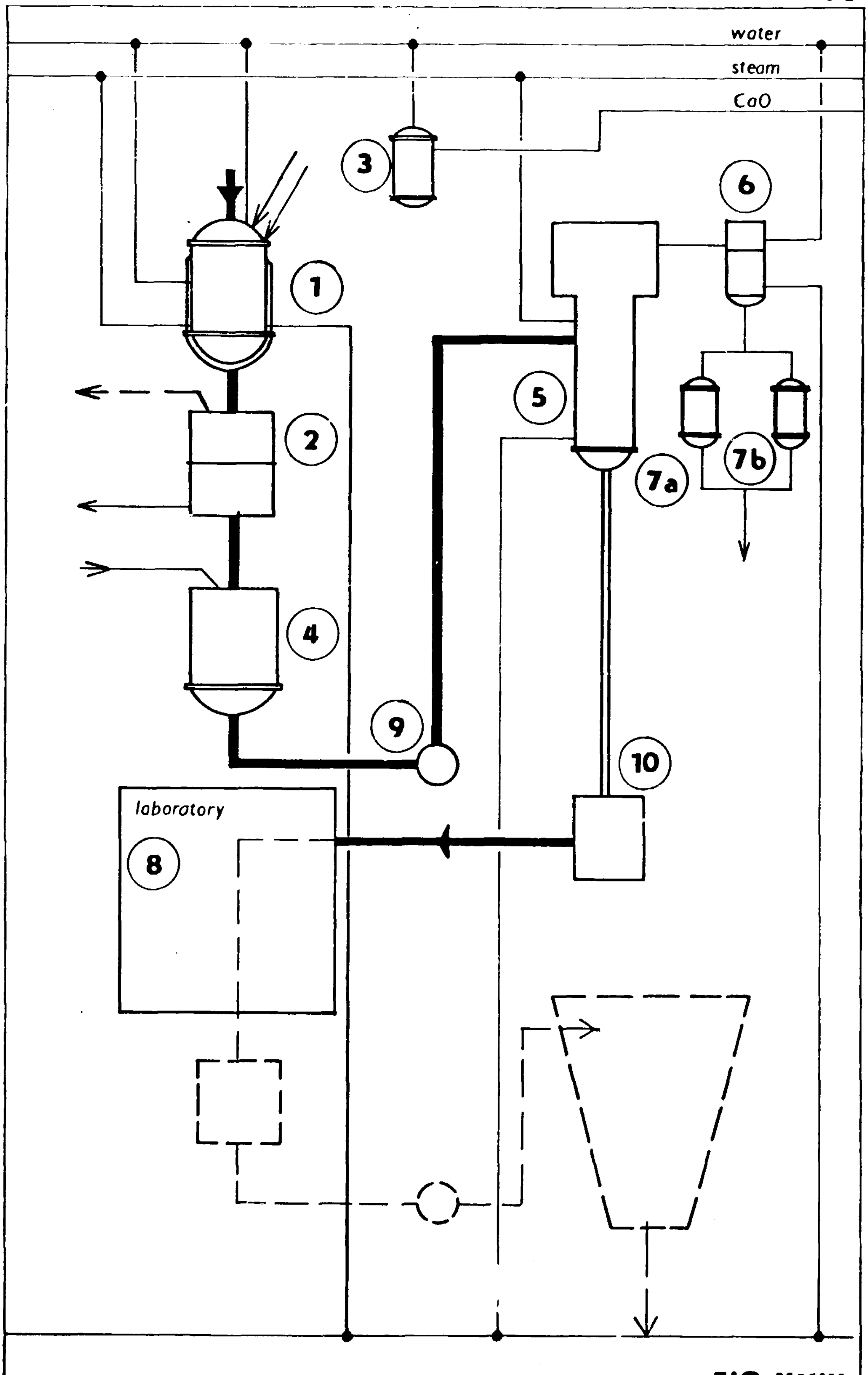


FIG. XXIII

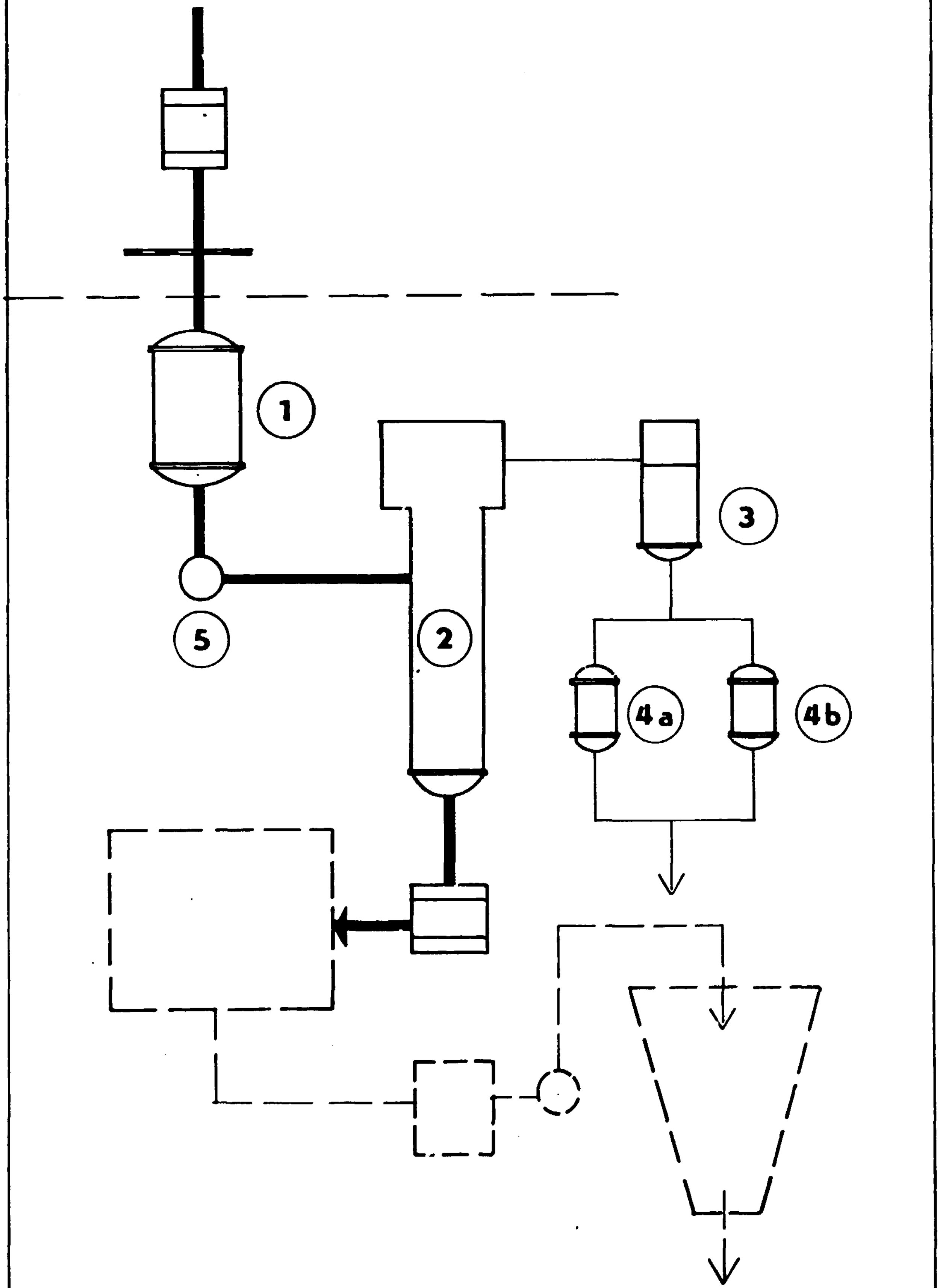


FIG. XXIV

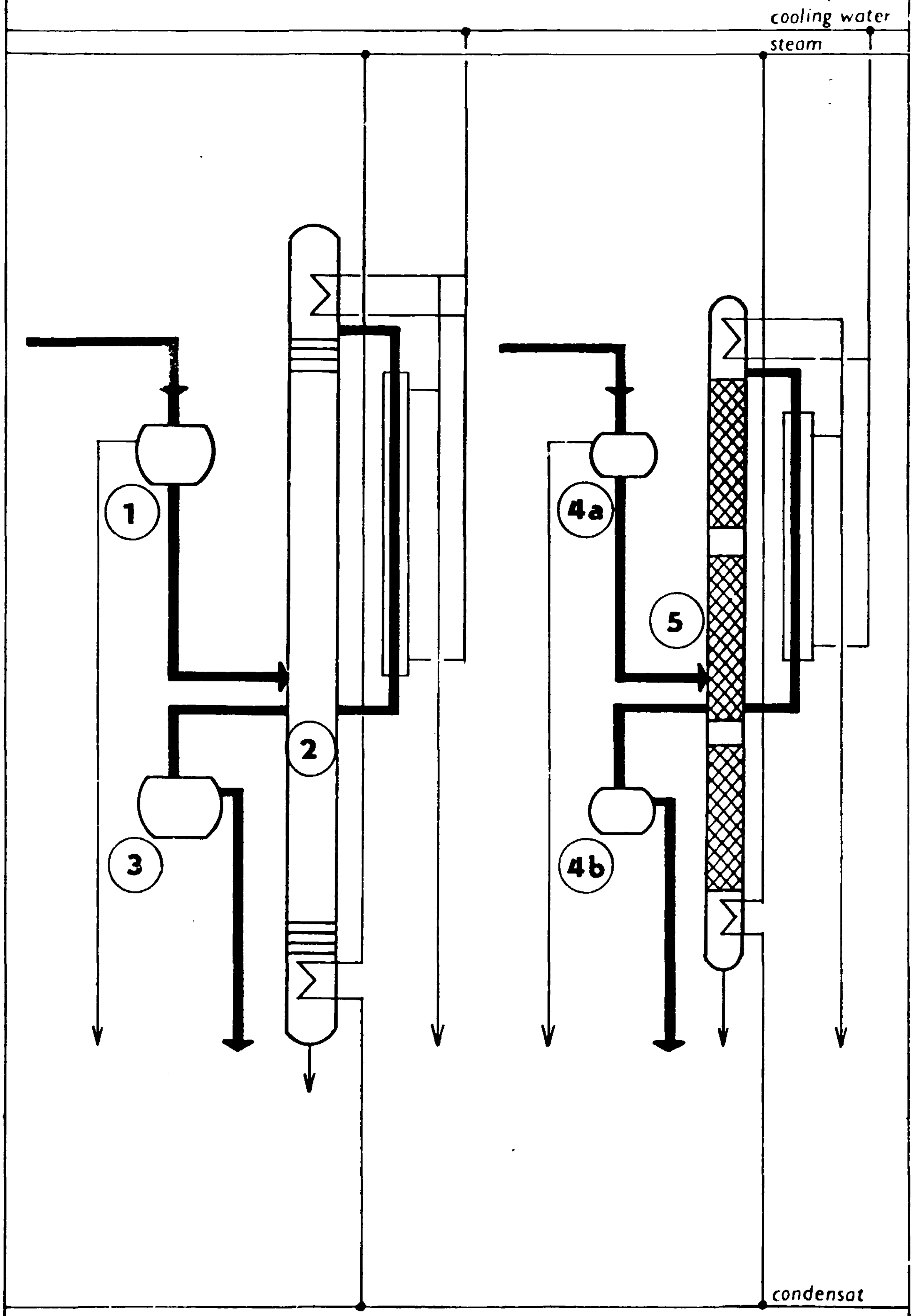


FIG. XXV

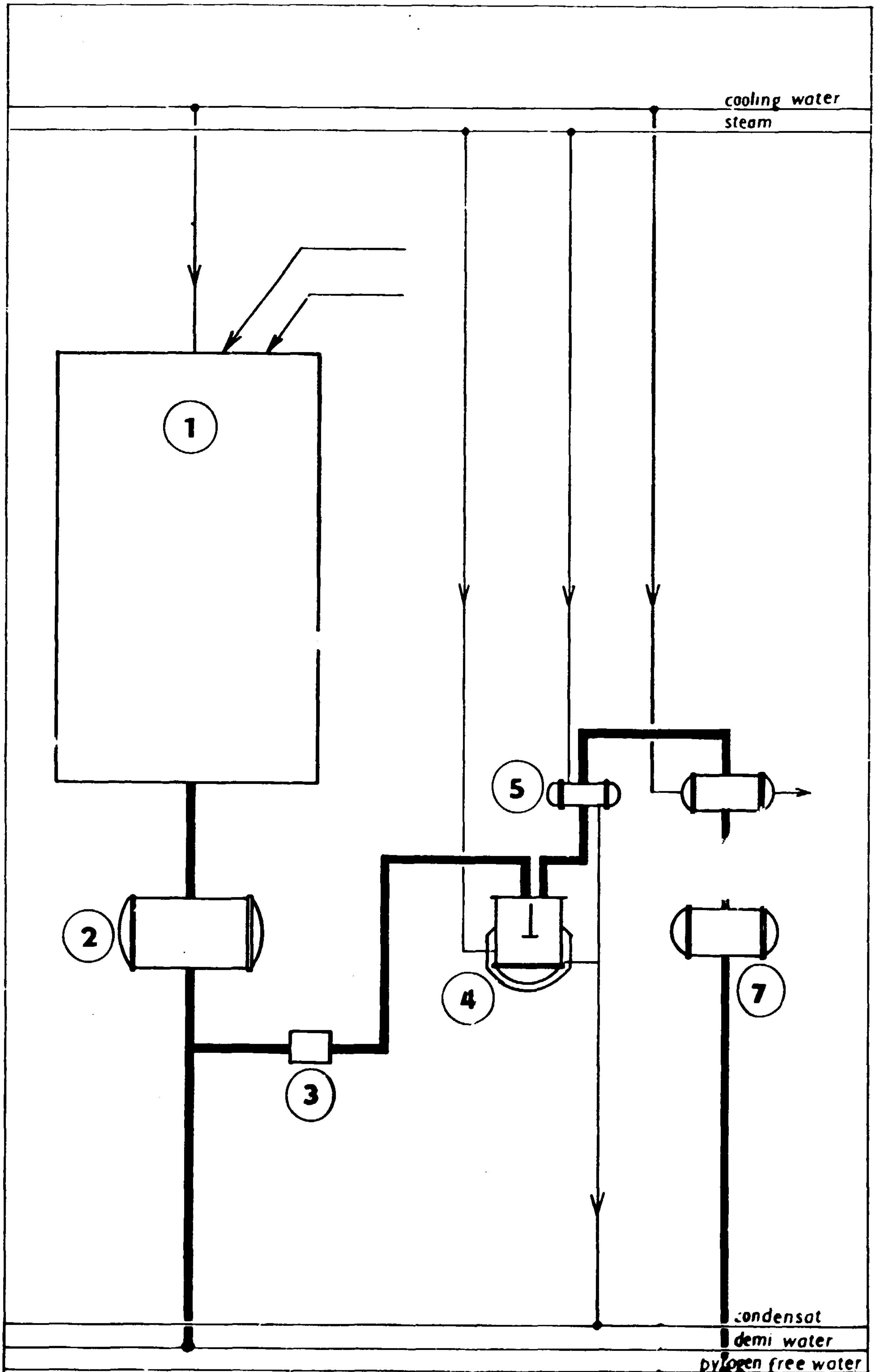

cooling water
steam
1
2
3
4
5
7
condensat
demi water
pyrogen free water

FIG. XXVI

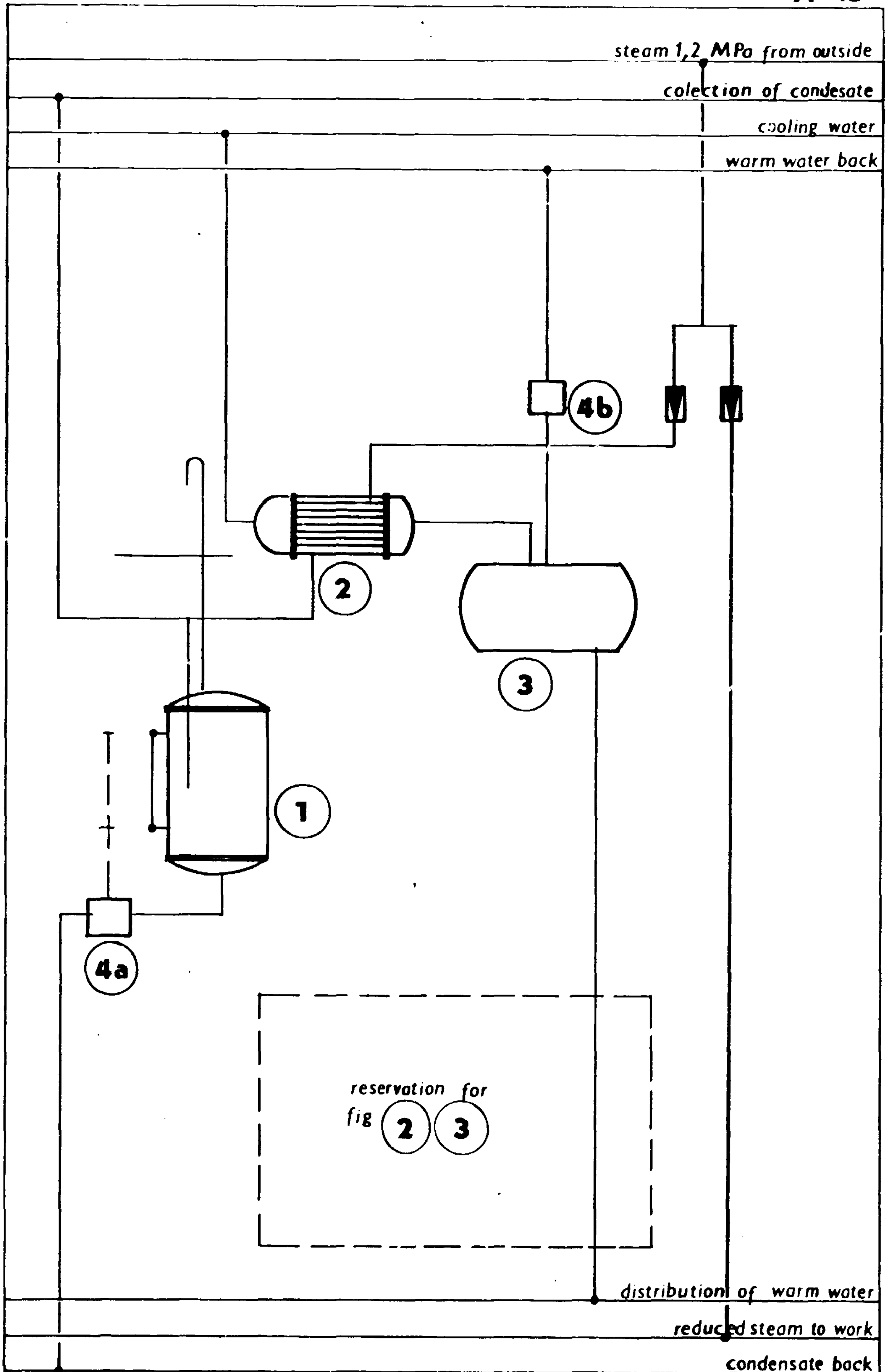

steam 1,2 MPa from outside
colection of condesate
cooling water
warm water back
4b
2
3
1
4a
reservation for
fig 2 3
distribution of warm water
reduced steam to work
condensate back

FIG. XXVII

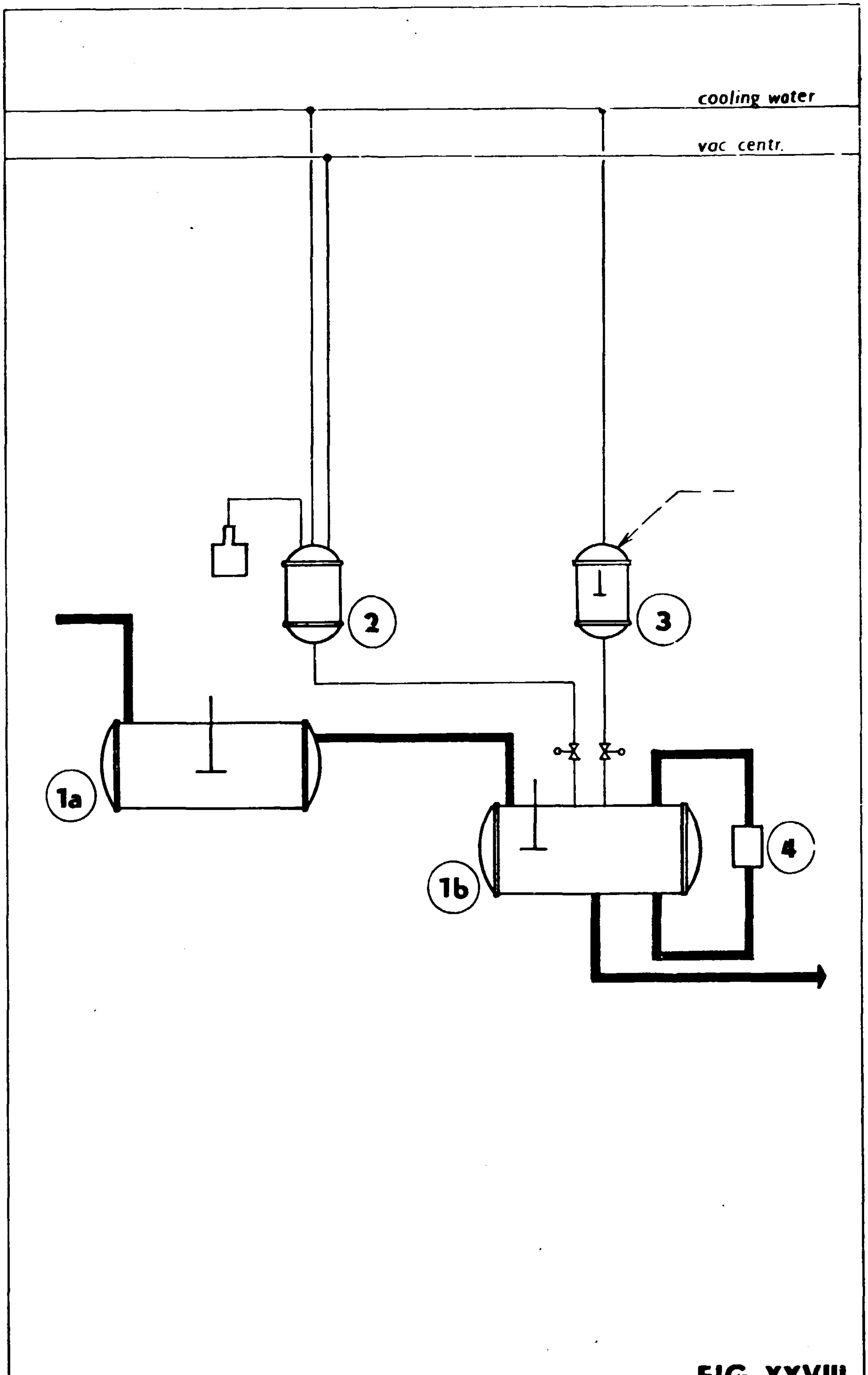


FIG. XXVIII

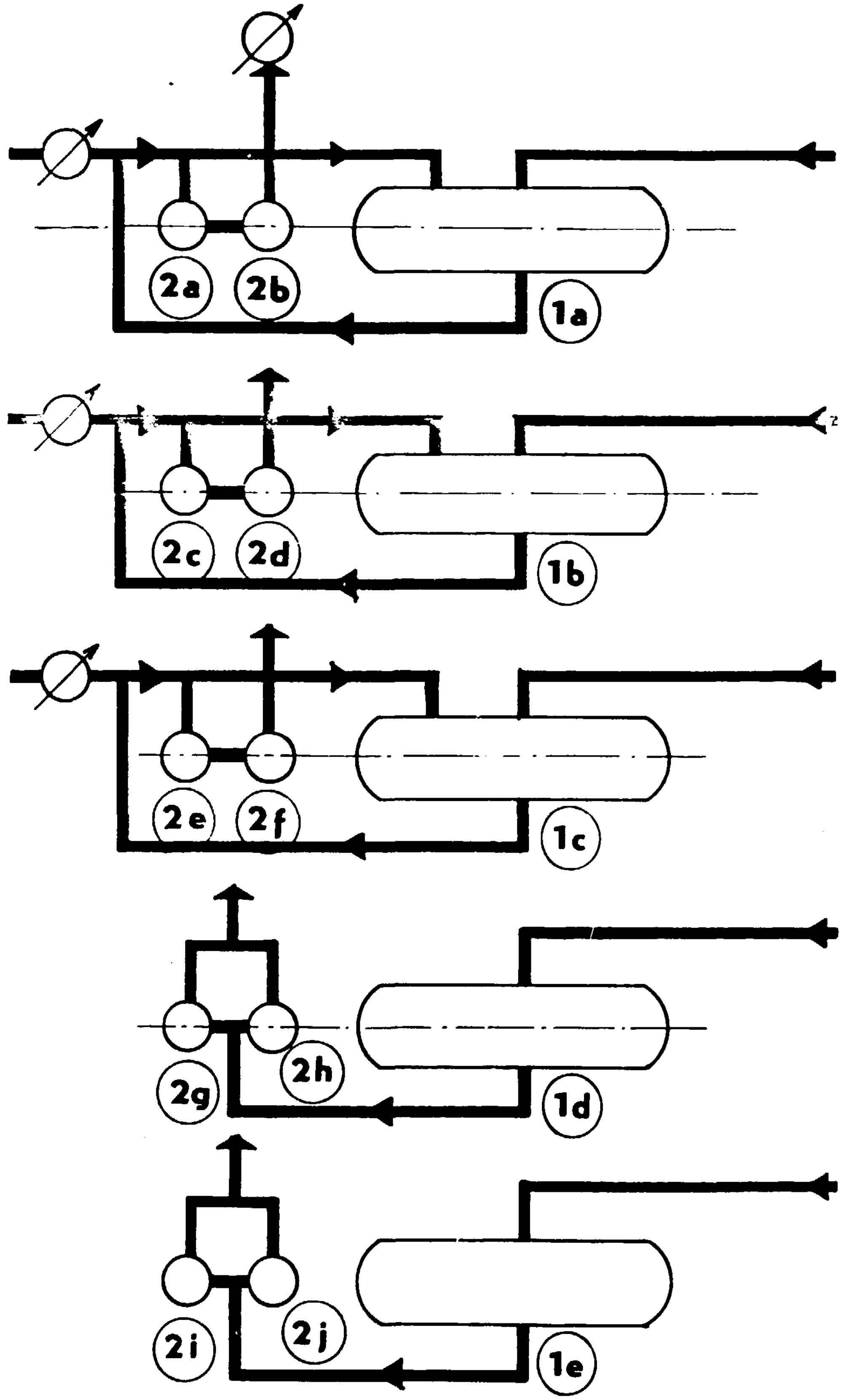


FIG. XXIX

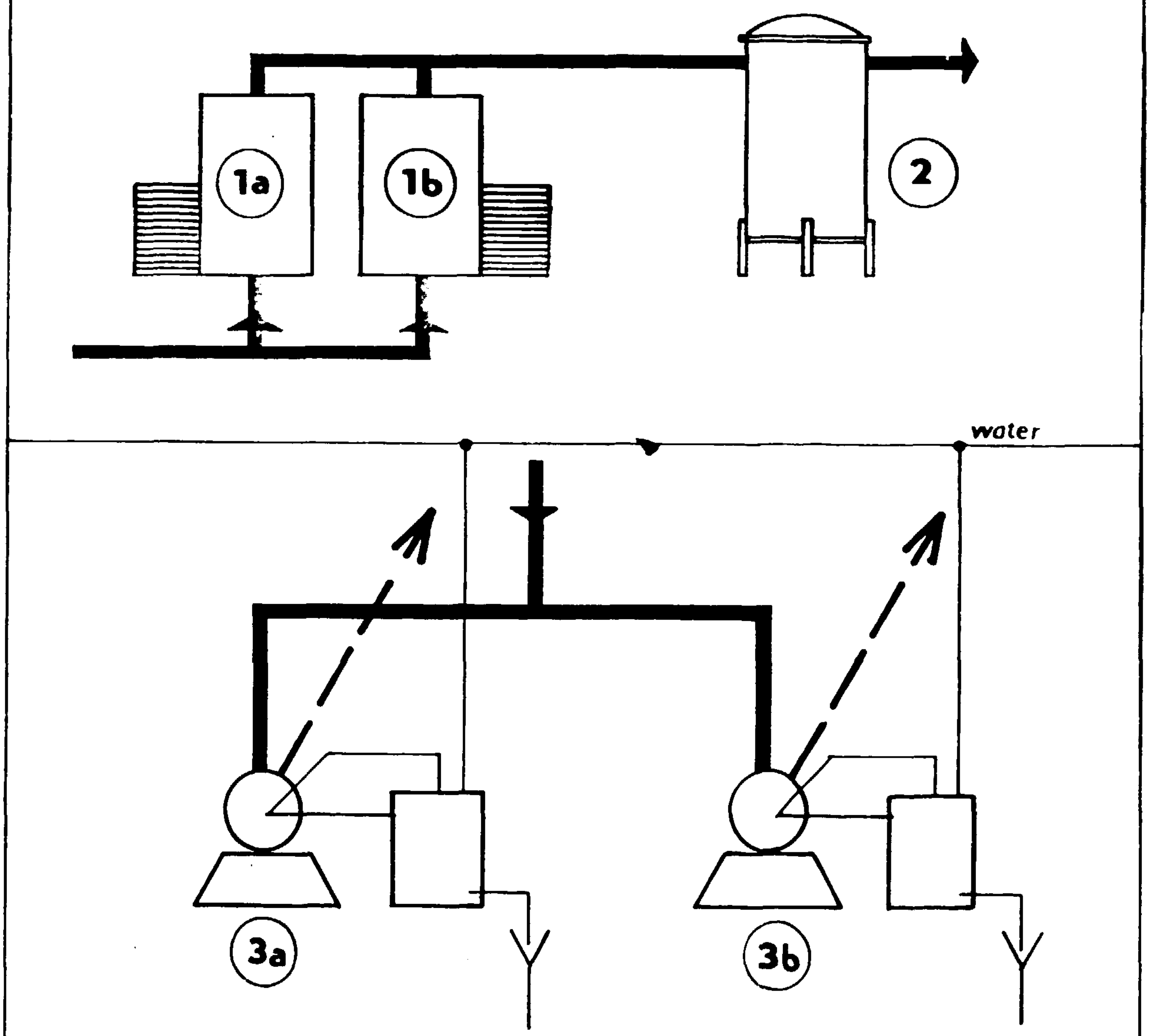


FIG. XXX