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STRENGTHENING THE CAPABILITIES OF CHINESE
ENTERPRISES FOR INTERNATIONAL TECHNICAL CO-OPERATION

TF/CPR/89/002

Diagnostic Report: Pig Production and Processing Project
in Tieling, People's Republic of China*

Prepared

for the Tieling Municipal Animal Husbandry Bureau,
Liaoning Province,
by the United Nations Industrial Development Organization

original contains
color illustrations

Based on the work of E. Steffensen
Consultant, Food Technology

I. EXPLANATORY NOTES

A. Exchange Rate

During the mission the value of the local currency was 4.74 Yuan to a US dollar.

B. Abbreviations

TMAHB Tieling Municipal Animal Husbandry Bureau.

LPCFER Liaoning Provincial Commission of Foreign
Economic Relations and Trade.

FU Feed Unit. One FU is defined as the feed energy
in 1 kg barley with a water content of 14%.

II. ABSTRACT

A. General

This diagnostic report concerns establishment of a pig producing and processing project with a capacity of 80,000 pigs/year. The main aim of the project is to encourage the local farmers to raise pigs more efficiently and thereby obtain a better meat quality and utilize the feed resources more economically.

International know-how and expertise for establishment as well as running of the project is intended to be earned through export of meat products in a joint venture with international companies.

The potential of exportable products is estimated at approximately 4,000 t/year.

B. The plant

The general impression created during the mission is that it should be possible to establish a pig producing and processing project in Tieling City, according to international standards and as specified below.

The impression is created by the following facts:

The feed resources are available in the form of the existing agricultural production. Though the feed for the project is an addition to the prevailing consumption, the amount is negligible compared to the total production in the province.

The basic skill for pig breeding is present, as already now a number of pigs are bred and raised under conditions similar to those for international farms.

The animal husbandry as well as the veterinarian institutions are already functioning, guiding and supporting the farmers.

Last but not least, the project has the support from all Chinese authorities at all levels.

To make the project meet the international standards the following will have to be imported:

Know-how regarding the design of the project according to international standards including adherence to the prevailing veterinarian rules and regulations.

The initial breeding animals.

Know-how regarding breeding and raising the pigs efficiently and economically as well as to introduce modern breeding and feeding methods. The present average feed ratio in Tieling is 3.2 FU/kg pig. The corresponding ratio in Denmark is 2.8.

Part of the equipment for the breeding farms as well as for the abattoir and processing plant.

Know-how regarding running and maintaining the plant efficiently and economically as well as to introduce modern slaughter and processing techniques.

Management support to guarantee quality and consistency in the production, especially as far as the export products are concerned.

C. Marketing

The major problem for the establishment of the project is the marketing of the export products.

Generally China is considered a non diseasefree area. Under certain circumstances a limited area may be approved as diseasefree and export could take place from such an area.

It is however, up to the importing country to say "yes or no" and to set the standards for the conditions of the breeding area and the animals, but also the processing plant, the shipping route etc.

The application/approval for the export will have to be dealt with at a government to government level.

This is especially applicable as far as fresh chilled/frozen meat products are concerned.

An alternative possibility is to manufacture cooked products, for which the rules and regulations are less strict.

The market for cooked products is however more competitive and therefore less attractive.

As the application/approval procedure takes a long time, it is very important that the procedure is initiated at an early stage.

D. Prospects

As expected, it has not been possible to make definite marketing arrangements so early in the project.

However, two companies have already shown interest in the project and are willing to discuss conditions for joint venture/marketing.

The companies are:

- The East Asiatic Company (Hong Kong) Limited
Beijing Representative Office.
- Marubeni Corporation, Japan.

Furthermore, obvious marketing targets would be the American forces in the Pacific (Japan, Guam, South Korea, the Philippines etc.) rather than the US mainland.

The approval procedure may, in principle, not be less strict, but they usually follow the country where they are stationed.

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IV. INTRODUCTION

This is the diagnostic report for a pig producing and processing project in Tieling City, Liaoning Province, China.

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as a result of a mission to China from 10. to 25. October 1990.

The objective of the mission was to verify the facts and findings presented by TMAHB in their pre-feasibility study and a project description prepared in October 1989.

A job description is included in annex 1.

V. HISTORY AND BACKGROUND

The project is initiated by TMAHB in September 1989.

The aim is to introduce and develop better and more efficient pig breeding as well as meat processing techniques.

The project will encourage the farmers to raise pigs more efficiently and thereby utilize the feed resources more economically.

Reference is made to:

Document of Liaoning Provincial Nationality Affairs Commission (1989) No. 42 of October 31, 1989: "The project proposal of a meat producing and processing integrated complex in Tieling City".

Document of Liaoning Provincial Planning and Economic Commissioning (1989) no. 566 of October, 1989: "An official reply to the project of building a meat producing and processing integrated complex".

Document prepared by Unido Centre for International Industrial Co-operation, Beijing: Slaughtering and Meat Processing Factory, Tieling City, Liaoning Province, dated 28. December 1989.

Copies of the documents are attached in annex 2.

Following discussions with UNIDO's representative in Beijing, in the beginning of 1990, TMAHB requested UNIDO, in the spring of 1990, for financial support for the preparation of a diagnostic report.

For investigating the present stage of processes and procedures within the animal breeding, slaughter and processing

Mr Chen Sheng, Vice-Director, TMAHB.

Mr Chi Xin Ming, Official, LPCFER.

visited Denmark from 16. to 22. September 1990, on the initiative of UNIDO.

During their visit they met with Intercool Food Technology Ltd. for discussion regarding the project. See "Memorandum of understanding" in annex 3.

Intercool Food Technology Ltd. also accompanied them during visits to:

Danish Meat Trade School, Roskilde.

Wolfking A/S, Equipment Manufacturer, Slagelse.

Oestrupgaard, Pig Breeding Farm, Oestrup, Faaborg.

Tulip, Pig/Cattle Abattoir and Meat Processing, Grindsted.

Tulip, Sausage Factory, Vejle.

Funki, Pig Farm Equipment Manufacturer, Herning.

During the meetings it was decided to reduce the project from a combined cattle and pig project to a project solely for pigs. This is also stated in the "Memorandum of Understanding".

The reason being to reduce the complexity of the project in order to give it an easier and less problematic start-up, especially with respect to the marketing of the export products.

The mission to China was conducted during the 10. to 25. October 1990 and the report was prepared immediately thereafter.

As the first part of the mission, TMAHB had arranged a tour through Tieling City in order to introduce and show the present position of animal production and processing as well as proposed locations for the project.

During meetings the last 2 days of the mission the project was discussed and defined. The result of the discussions is reflected in the specification of the project in this report.

Annex 4 is a list of persons who participated in the meetings.

VI. MARKETING

A. General

For investigating the market possibilities, UNIDO, Beijing office, has had meetings with the Japanese as well as the American Embassy in Beijing in order to discuss the following questions from Intercool Food Technology Ltd.

1. Does China have an export of fresh or frozen pork meat to Japan or to USA.
2. Has there been any applications from China with the purpose of being approved as exporter to any of these countries.
3. Who is responsible for such applications from China.
4. Which are the exact problems in order to be approved.
 - which diseases.
 - how long has an area to be diseasefree.
5. Can the authorities in Japan/USA approve a geographically limited area, if the area is diseasefree, and if yes what are the conditions.
6. Are there any other conditions (political, economical) which could play a role in connection with an approval.
7. Would the Eastern region (Shanghai area) be able to obtain an approval.

Following are the outcome of the discussions with the embassies.

The Embassy of Japan:

- re. 1. No. There has never been any export of fresh or frozen pork from China to Japan.
- re. 2. To the best of their knowledge there has never been any applications to be recognized as exporter of fresh or frozen pork to Japan.
- re. 3. It is always the joint venture/factory/export organisation who is responsible for the export licence application, incl. health certificate which is issued by the local health inspection organisation:

The Animal Inspection Institute under Ministry of Agriculture and TMAHB.

They are controlled centrally from Beijing by Ministry of Agriculture and TMAHB.

- re. 4. There is a Japanese law and a special set of legislation for China covering both diseases and for how long an area has to be diseasefree.

It was understood that the special rules for China are very tough because the Japanese consider China a high risk disease area and with very un-hygienic conditions.

All approvals must take place between the Japanese and the Chinese governments, between the two agricultural ministries.

When exporting the Chinese government must issue a health certificate which is in accordance with the regulations set out in agreement between the two governments.

The Japanese government will then stipulate the most direct shipping route and the route/shipping line/equipment must be approved by the Japanese government.

It will not be possible to ship say via Hong Kong to Japan, as there may be diseases in Hong Kong.

- re. 5. The Japanese Ministry of Agriculture can approve a limited area, if this area meets the standards set out in the above legislation and set of rules applying for China.

This has already happened in Tianjin and in Shandong Provinces in the city of Yantai, where there are two Japanese joint ventures producing and exporting fresh/frozen and prepared beef for the Japanese market.

- re. 6. As far as Japan is concerned there are no other political or economical conditions applying.

- re. 7. Yes, if it meets the conditions set out in the above legislation.

The Embassy of the United States of America:

re. 1. No.

re. 2. There have been some applications but they have been turned down by the US Food Safety Inspection Service due to poor standard of hygiene.

A team from Food Safety Inspection Service visited China in september 1990, and their conclusion was that the Chinese are making progress, but generally still have a long way to go.

Hygiene and animal disease is the main concern of the US.

Continental Grain is raising pigs in Wuhan, Hubei Province, and they are regularly faced with Foot and Mouth Disease although they are based on US standards.

re. 3. As re. 3. above.

re. 4. It was recommended to read "Code of Federal Regulations - Title 7". However, one has to be careful with the interpretation, as different people in the US Administration interpretes the regulations differently.

All approvals must be agreed on a government to government level, between Beijing and Washington.

- re. 5. Yes, the authorities in Washington, i.e. the Food Safety Inspection Service and the Animal & Plant Inspection Service together with the Ministry of Agriculture can approve a limited geographical area, provided it confirms with the above mentioned code.
- re. 6 No. An american partner would make it easier, because he would know the "ins and outs" and the requirements of the code.
- re. 7. Yes, if it confirms with the above code. Basically, a team from the US authorities will visit and inspect the area, and the joint venture applying for permission to export to the US, in order to see if the installation, the plant, the breeding area etc. is up to US standards.

Since Denmark is already exporting pork to US, they did not expect any problems with the installations, the slaughterhouse, the cold storage, the meat processing plant.

The approval often fails on the basis of the hygienic standard at the individual farm raising the pigs.

It would be easier to obtain the approval for a "confined production area", i.e. where the pigs are raised in isolation within four walls of the slaughterhouse and meat processing plant.

It is easier to control the hygiene in a "confined area", as the workers can be "fumigated, washed and cleaned" every time they enter the confined area.

In order to ease and expedite the import application/approval procedures, it would be advantageous if a joint venture arrangement could include a partner in the importing country.

VII. LOCAL CONDITIONS

A. General

Tieling covers an area of 17,000 km² and it has a population of 3,500,000 people of which 2,700,000 live in the country side.

Within Tieling there are 2 districts, 2 municipalities, 5 counties, 164 towns and 2100 villages.

B. Pig breeding

The pig population in Tieling is 2,400,000 pigs and 1,000,000 are slaughtered per year. 200,000 are slaughtered in the 8 slaughterhouses in the area and 400,000 are slaughtered privately. 400,000 pigs/year are sold live to other cities.

The present situation is, with respect to the pig production in Tieling, that the pigs are bred and fed either on state owned farms with up to 50 sows or on family farms with only a few sows.

The majority of the pigs are the product of a local black sow and a boar of the Large White race. The result is white pigs.

In some cases, apparently due to lack of availability of a white boar, there are pigs from local black sow as well as boar.

As the local black sow is more resistant to the climate than the Large White, these are predominant in the family farms where the housing is of a more primitive character.

State owned and some of the bigger family farms, where the pigs are kept in closed houses, have sows of the Large White race.

Pigs from the local black sows are claimed to have a slower growth than those from the Large White sows. It is also the impression that pigs from local black sows build a thicker fat layer.

The basic breeding animals of the Large White race are delivered from the breeding stock farm in Hangzhou City, Zhejiang province near Shanghai. The Hangzhou animals originate from pigs imported from Denmark in 1969.

C. Feed

In Tieling the grain production (mainly maize, rice, wheat, soybean) amounts to a total of 3,500,000 tons per year.

The pigs are generally fed on the basis of a recipe worked out by TMAHB. Copy of a typical recipe is shown in annex 5.

This recipe will of course have to be adapted to the imported breeding stock in the project. According to Danish experience the amount of maize should be slightly lower and the fish meal should be stopped at an earlier stage in order to obtain the optimal meat/fat quality.

As an average it takes 210 days to raise the local pigs to a slaughterweight of 125 kg. The corresponding feed consumption is 3.2 feed units/kg of meat. The prevailing average price for feed according to the recipe is 0.20 US dollars/kg.

Representatives of the local TMAHB visit the farms regularly (approx. once a month) with the purpose of guiding the farmer with respect to feeding as well as other aspects of the breeding.

D. Pig health

The health of the pigs is looked after by the veterinarian section of TMAHB.

The section has 59 senior and 240 ordinary veterinarians.

It was explained that shortly after 1949, measures were introduced in order to fight foot and mouth disease as well as other infectious diseases. It was pointed out that, to-day, there are no serious diseases in the pig population of Tieling.

TMAHB issued a statement to that effect. The statement is copied in annex 6.

VIII. DESCRIPTION OF THE PROJECT

A. General

Based upon the initial documents prepared by LPCFER and upon the discussions during the mission, the project is defined and specified as follows.

The main components of the project are:

1. A sow farm for production of 80,000 piglets/year.
2. A pig breeding farm for 10,000 slaughter pigs/year.
3. An abattoir for slaughter of 80,000 export pigs/year and 70,000 local pigs/year for domestic market.
4. A processing plant production of fresh and cooked products for export.

Attached to the project there will be:

5. Seven pig breeding farms, which on contract basis will raise 7 x 10,000 slaughter pigs/year to the project.

The project is mainly based upon breeding, slaughtering and processing of 80,000 pigs/year with the purpose of exporting as much of the products from the processing as possible.

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Following is a break down of the potential export products from pigs of 110 kg liveweight:

Product	Fresh products kg/pig	Processed products kg/pig
Loin		
Tender loin	1.0	
Pork loin	8.6	
Loin butt	1.8	
Trim meat		1.6
Belly		
Bacon		3.4
Brisket		2.0
Clear belly		3.0
Belly		1.2
Trim meat		1.0
Shoulder		
Shoulder meat		6.6
Butt		1.8
Picnic		1.2
Shank	3.0	
Trim meat		1.0
Ham		
Ham meat		10.6
Shank	2.4	
Trim meat	—	<u>1.2</u>
Total kg/pig	16.8 =====	34.6 =====

At a slaughter of 80,000 pigs/year the yearly export potential will be:

Fresh products:	1344 t/year
Processed products:	2770 t/year

However, in order to contribute to the local consumption as well as to improve the feasibility of the project an additional slaughter of 70,000 of local pigs purely for local consumption has been included.

The specification is to be considered as a frame for the further work, as adjustments may show necessary in the next phase, the feasibility study, depending on the export possibilities and in order to secure a feasible project.

B. Breeding Stock

General

In order to secure a supply of pigs with export quality lean meat it is necessary to introduce and promote modern and scientific pig production methods.

This will ensure an optimal quality of the pigs, good growth characteristics and high fertility provided a very careful selection of basic breeds and the combination of breeds to be used.

It is recommended to use Large White or Yorkshire for their hardiness and appetite, Duroc for growth and Landrace for the meat quality.

Modern equipment such as ultrasonic measuring instruments is proposed to be used for control of leanness of live pigs as well as slaughtered pigs.

By computing growth rates, feed conversion and reproduction data, the combinations of breeds will be selected to ensure the most economical production methods under the prevailing conditions.

Initial stock

A sow is pregnant for 114 days.

The suckling period of a piglet is 4-5 weeks (28 to 35 days).

A sow will be served by a boar 5 to 7 days after weaning. Some sows will have to be served again 3 weeks later, because they did not get pregnant during the first service.

In one year (365 days) a sow can get 1.8 to 2.4 litters. Number of weaned piglets per litter is estimated to be 9, but can vary from 8 to 10. Assuming an efficiency level of 2 litters or 9 pigs per litter, 18 pigs per sow per year will be produced.

To produce 80,000 pigs for slaughter annually, 4,500 sows (parent stock) are needed.

In order to maintain a herd of approx. 4,500 sows, where the replacement rate is 25 to 35 percent, 1,100 to 1,600 new Dan-Hybrid gilts have to be taken into the herd on a yearly basis (parent stock). This requires a grand parent stock of approx. 180 to 270 sows and 10 to 15 boars. From each of these sows, 6 gilts can be recruited for breeding per year.

The sows (parent stock) are Dan-Hybrids (crosses) between Danish Landrace and Danish Large White.

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The 180 to 270 grand parent sows also have to be maintained. The replacement rate is approx. 50 percent, which means that 90 to 135 animals (grand parent sows) have to be replaced per year. This requires a further 15 to 23 great grand parent sows from an especially high genetic level as well as 3 to 4 boars.

The Danish Duroc is recommended as Sire line (male line) for the production of slaughter pigs. For 4,500 sows approx. 135 boars are needed. To obtain 135 boars, 25 to 35 Duroc sows are required.

The animals will be delivered when they are 13 to 25 weeks old. The gilts (grand parent stock) can be served when they are 6 to 9 months. This means that approx. 4 to 7 months after delivery, the first farrowings can be expected.

The parent stock (Dan-Hybrid) can be served when they are about 6 months old. After approx. 4 months the first 3 line crosses can be expected. After another 5 to 6 months the first slaughter pigs will be ready for delivery.

With a grand parent stock of:

180 - 270 sows and
10 - 15 boars

full production of 80,000 slaughter pigs/year can be expected in the 5th or 6th year.

In the light of the overall establishment of the project, full production is desirable in the third year.

The grand parent stock should then comprise:

350 sows and
20 boars.

C. Breeding farms

The breeding of the pigs for export is to take place on 8 farms, each with a capacity of producing 10,000 slaughter pigs/year.

One of these farms is to be located near by and be part of the project.

The sow farm where all the piglets for all the eight farms are produced is also to be located near by and be part of the project.

The remaining seven farms are to be placed at locations in Tieling as indicated in annex 7 and be the responsibility of local breeders, i.e. towns or counties.

A contract between the project and the breeders will spell out the conditions for the lay-out and arrangement of the farm, the conditions for buying the piglets and selling the slaughter pigs, conditions for raising and maintaining the pigs (feeding, health etc.) .

The contract breeders will themselves arrange for funds necessary for establishing the farm, purchase of pigs, purchase of feed, running cost etc.

The project will provide support to the farmers in the form of feed recipes, guidance with respect to the optimal breeding of the pigs etc.

In annex 9 and 10 there are lay-out proposals for the sow farm as well as for one fattening farm.

For practical reasons (management and overview, diseases spreading etc.) the sow farm is proposed arranged in 8 identical buildings.

Each of the project farm buildings (the sow farm and one fattening farm) are, as part of the project, arranged according to the latest development and provided with automatic feed preparation and feeding system, automatic ventilation, manure removal and disposal system etc.

D. Abattoir and Processing Plant

General

It is assumed that the export pigs are to be slaughtered in one shift and the pigs for domestic market in another.

Considering 300 working days/year the daily slaughter will thus be 500 pigs/day in two shifts.

In annex 11 is a lay-out proposal for the abattoir and processing plant.

Lairage

The lairage is to accommodate one day's throughput of export pigs as well as the pigs for the local market, a total of 500 pigs.

The lairage will have watering facilities, but no feeding. In the lairage there will be facilities for the proper ante mortem veterinarian inspection of the pigs.

Slaughter

The slaughter facilities are to have a max capacity of 270 pigs/shift, i.e. slaughter of the export pigs in the one shift and the local pigs in the second shift.

The slaughter is assumed to be performed on a modern continuous line with automatic machinery and equipment wherever applicable, all according to international rules/regulations/standards.

Export carcasses are railed directly to chillrooms.

Carcasses for the local market are dispatched hot. There is, however, a chilled area where carcasses can await dispatch.

By-products, heart, liver, lungs etc. are dispatched directly to the local market.

Head, feet, stomach and casings are cleaned, cooked and then dispatched to the local market.

Blood, hair and bones are dispatched for rendering elsewhere.

Fat from the slaughter as well as from the cutting department is minced, melted, refined, chilled, filled into 180 kg drums and dispatched.

Processing

The processing comprises cutting/deboning department, fresh meat packing facilities, cooked/canned meat production department, can store, chill store, freezer and cold store.

The list of products will of course depend on the marketing.

However, it is at this stage assumed that the best parts of the carcasses are cut into consumer size pieces, packed and dispatched as chilled/frozen products for export.

The secondary parts are used in the production of cooked/canned products.

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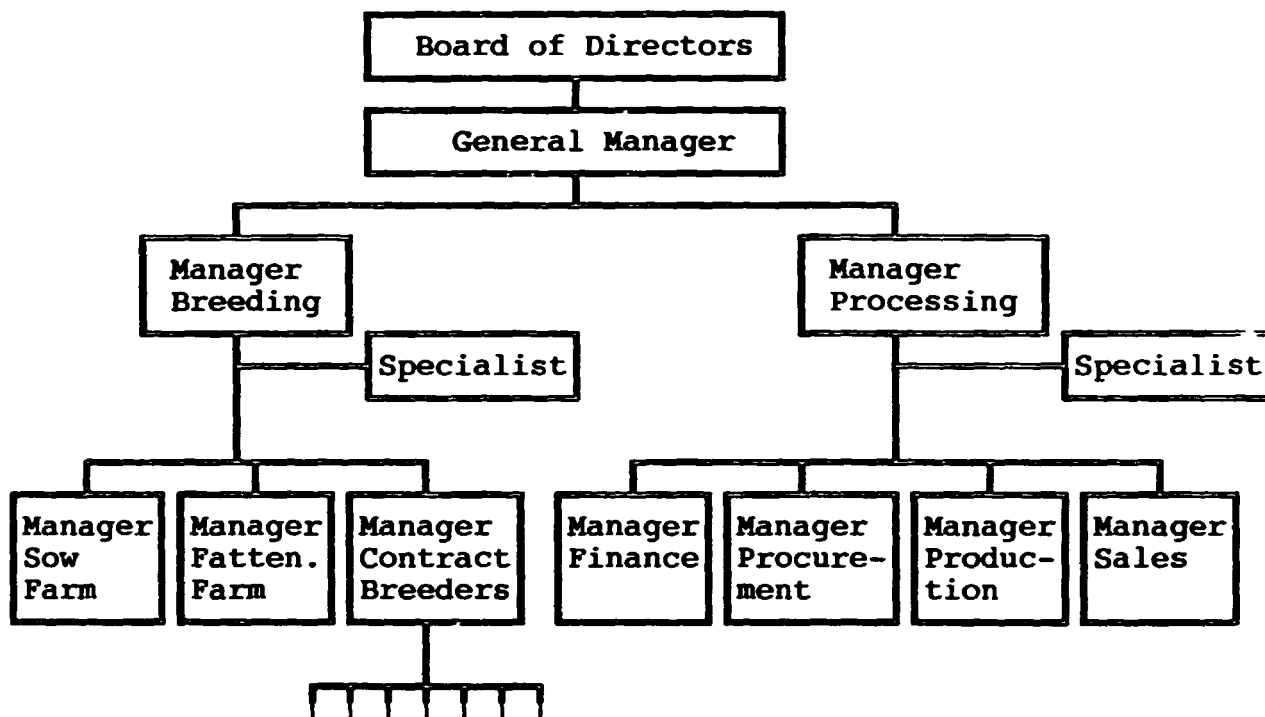
Rind, trimmings, bones etc. are dispatched to the domestic market.

Fat from the cutting and trimming is processed together with the abdominal fat.

IX. ORGANIZATION

A. General

The project organization will in principle be as follows:



In the board of directors there will be representatives from the Chinese partners as well as from the joint venture partners.

B. Breeding

The organization of the breeding section will comprise a management which is responsible for the sow farm, for the one pig raising farm which is a part of the project and for the arrangement with the contract breeders.

International specialists in veterinarian as well as in breeding aspects will be attached to the organization.

C. Abattoir and Processing Plant

The organization will include the four primary functions: Procurement of raw materials (live animals), production (slaughtering and processing), marketing (sale of products) and the control function (financial section).

The section for procurement of raw materials is responsible for the supply of export pigs for slaughtering from own farm and from contract breeders as well as local pigs for domestic market.

Apart from proper production activities, the production section is responsible for production planning, personnel recruitment, economical utilization of machines and equipment, quality control, yield control, cost control, purchase and supply of materials used in the production.

The section for sales is responsible for market research, marketing, budgetary control and sales forecast, salesmanship and selling and sales promotion.

The financial section will be responsible for the efficiency of the enterprise in order to make sure that profits are reasonable and that the assets more than cover the original capital invested. This will include building up reserves to replace worn-out machinery, to allow for capital expansion, and to enable discontinuation in time of non-profitable undertakings.

The organization will include international specialists in veterinarian, slaughtering, processing and marketing aspects.

X. TIME FOR IMPLEMENTATION

Activity -----	Month no. -----
Verification of diagnostic report	1
Feasibility study	2-3
Verification of feasibility study	4
Loan applications	4-5
Joint venture agreements	5
Final decision and signature	6
Purchase of breeding stock	7
Build-up of slaughter stock	7-36
Detailed design	6-9
Permits	7-10
Building period	10-36

This means that the total project could be in operation approximately 2.5 years after the final decision has been taken.

The total time is, however, indicative only, as at this stage it is not possible to judge the time necessary for the import applications/approval procedure. The time for this procedure has not been included.

XI. INVESTMENT

The investment as well as the local/imported content should be calculated in details in connection with the preparation of the feasibility study, but for the purpose of indicating a possible financial structure of the integrated project the following figures can be used.

For the purpose of reference the estimate is calculated in US dollars. Part of the investment will naturally be in local currency.

	Local 1,000 USD	Foreign Currency 1,000 USD
Breeding stock		620
Breeding farm incl. the sow farm and one fattening farm (10,000 pigs/year)	7,400	4,600
Abattoir and processing plant	3,900	3,400
Planning, design, supervision	430	1,300
Pre-operationals	1,000	1,000
Working capital	430	340
Total	13,160	11,260

Total investment US Dollars

24,420,000

=====

XII. FINANCING

Assuming a joint venture company is established a possible financing could look as follows; all in 1,000 US Dollars:

	Local Currency		Foreign Currency		Total	% of Share Capital
	Share	Loan	Share	Loan		
Local Partner	6,000	-	-	-	6,000	80%
Foreign Partner(s)	-	-	1,500	2,150	3,650	20%
Local Fin. Inst.	-	7,160	-	-	7,160	
Foreign Fin. Inst.	-	-	-	7,610	7,610	
TOTAL	6,000	7,160	1,500	9,760	24,420	
	13,160		11,260			

XIII. RECOMMENDATIONS

A. Discussion

It may be difficult to convince prospective joint venture partners to risk a larger investment in the project before approvals from the importing countries are obtained.

As these approvals are to be applied for and obtained at the government level it is recommended that the application procedures are initiated immediately.

It may take a long time before the approvals are obtained (most probably years).

It is however expected that prospective joint venture partners could be persuaded to enter into a joint venture with a minor share even before the approvals from Japan and USA are obtained.

The reason is that it might be possible to establish an export of fresh and frozen meat to "third" countries (Sovjet Union, Korea etc.).

Furthermore, as the import regulations are less strict for cooked, canned products it may be possible to export these products to Japan.

Finally, it would be attractive for a foreign joint venture partner to get a foot-hold in China in order to be established the day when all the approvals have been given.

For these reasons a small equity share for the foreign partners is proposed.

The consequence is that it will be necessary with a significant amount of foreign currency financing from external sources such as foreign aid institutions, financing institutes, banks, etc. However, this financing might only be available if the project has been given sufficient priority from the Chinese Government to establish the required guaranties.

The advantages for the Chinese partner are that the joint venture partners will transfer international know-how to the project and will participate in the project with the intention that it should be a profitable enterprise and with the aim of achieving highest possible export quantities.

The Chinese partner is to take the importing and basic decision whether to go ahead with a joint venture project even with a minimum of foreign investment.

If this decision is positive it is recommended that a feasibility study is carried out. The study should be started as soon as possible and be carried out as an activity parallel to the import application procedure.

The study is the necessary basis for defining the final size, capacity, specification, budget price etc. of the project.

The study should analyse an initial situation when import approvals are not obtained and a situation where the approvals have been obtained.

Furthermore it will be a very important document in the negotiations with possible joint venture partners, financing institutions, marketing partners etc.

Finally, the feasibility study will also be useful in the process of obtaining approvals from building as well as veterinarian authorities.

It is recommended that funds for carrying out the feasibility study are allocated soonest possible in order that the study can be initiated.

B. Summary

The above discussion can be summarized as the following actions to be taken by the Chinese partner:

- The Chinese partner is to make a decision whether to go ahead with the project even if the capital injection from joint venture partners is minimal.
- If affirmative allocate funds for carrying out the feasibility study and initiate the feasibility study simultaneously with the import application procedure.
- Initiate the search for suitable joint venture partners.

XIV. VISITS

General

TMAHB had prepared the following tour programme with the purpose of presenting the existing situation regarding breeding of pigs and cattle in Tieling City.

At the tour were also visited sites proposed to be locations for contract breeding farms.

The tour route is shown on the map of Tieling City in annex 7.

As the project will be based upon pig breeding and processing, no cattle initially, emphasis has been put on visits of pig farms.

Visits were also paid to a pig abattoir and processing plant as well as a poultry processing plant, both in Tieling.

Finally, the proposed site for the Abattoir and Processing Plant was visited.

Participants in the visits were:

Chen Sheng, Vice-Director, TMAHB (part time)
Liu Zheng Yuan, Chief Advanced Vet. Section, TMAHB
Yau Yuzhen, Interpreter, TMAHB (part time)
Chi Xin Ming, Interpreter, LPCFER (part time)
Ejnar Steffensen, Intercool Food Technology Ltd.

Existing breeding farms

At each of the locations the participants were met and accompanied during the visit by the local Head of City / Head of Town / Head of Village / Representative of the local TMAHB, at all places including various local officials.

Hen Dao River Town

Here, they breed 15,000 pigs/year out of which 10,000 are slaughtered in the town and 5,000 are slaughtered elsewhere.

The biggest farm has approximately 100 pigs and the smallest 20 pigs. The pigs are slaughtered at a liveweight of approximately 110 kg.

Four family farms were visited. In the one there were Large White pigs indoor, in the others there were local black sows in partly open houses. The boars were Large White, one for each of the bigger farms, smaller farms often share a boar.

Kaiyuan City

Here we visited the Kaiyuan sow breeding farm where they have 50 sows and 4 boars, all based upon Large White "imported" from the breeding farm in Hangzhou City, Zhejiang Province near Shanghai. Hangzhou is a major breeding farm which supplies breeding stock, to the whole of China, based upon animals originating from Denmark.

The major function of the Kaiyuan farm is to breed and sell boars. Female pigs are slaughtered. They sell approx. 960 animals/year, $\frac{1}{2}$ male, $\frac{1}{2}$ female.

The pigs are fed with maize and soybean from own farm and fishmeal, bonemeal etc. bought on the market. All according to a recipe from Hangzhou.

The farm is located in the open farm land approx. 500 m away from the village. The farm is surrounded by a brickwall. Entry to the farm is for lorries through a bassin, with disinfectant, at the gate; and for persons through a bassin with lime.

One of the managers is also a veterinarian. He gives injections when required, in case of fever (cold), stomach troubles etc.

The pig pens are kept in brickwalled, tile roofed houses, the pigs looked clean and healthy and the whole farm gave impression of proper arrangement and good management.

Jingou Town, Village of Tian

Family pig house with 8 local black sows and 1 Large White boar from Kaiyuan farm. Part of the bred pigs are sold to other farmers as piglets, the rest are fed to slaughterweight before sold.

Xifeng County

The area is part of Long White Mountains with 70% mountain/hill area and 30% villages and farmland. The area is ideal for cattle as they can grass in the hills.

In the county there are a number of family cattle farms, the biggest with approx. 500 cattle and the smallest with 3.

The cattle, local cows and Semendare/Chevrolais bulls, are raised to a liveweight of 600 kg and slaughtered. A number of approx. 1,000 is sent live to Hong Kong.

Since 1975 they have practised artificial insemination.

As supplement to grass the cattle are also fed with maize, soybean, maize stems etc.

A private farmer in Xifeng with 500 cattle was visited.

He buys the cattle approx. 12 months old and feeds them in approx. 4 years. Then his son will accompany them to Hong Kong, in order to look after and feed them during the one weeks travel.

The cattle are in the mountains during the day and are tied around the house during night.

As a curiosity a state owned deer farm (holding 1,000 deers) outside Xifeng was visited.

The main reason for the farm is to utilise the horns for medical purposes. The horns are cut off once a year and sold to Hong Kong, Japan etc. for a price of 2,700 yuan/kg.

Secondarily the deers are also slaughtered for utilization of the meat and the skin.

Yihe Village, 20 km from Xifeng

Here, there are a number of farmers holding 2-3 cattle each. Total for the village is approx. 1,000 cattle.

The cattle are grassing in the mountains and are eating the left overs from the harvest on the fields for maize.

A herd (cattle from a number of farmers) is shepherded by one man/boy.

A part of the cattle are sent live to Hong Kong for slaughter.

Faku County

The area of the county is 348 mill hectares which is mainly farmland for growing maize, rice, soybean, wheat and vegetables.

The county comprises 20 towns and 300 villages. Total population is 430,000 in 160,000 families.

The output from the animal husbandry is 160,000 pigs, 10,000 cattle, 7,000 lambs and 2.0 mill chicken for slaughter per year.

In general the sows are the local black and the boar is of Large White breed.

Zhen Chai Hill Village, 25 km from Faku.

Visited a few family farms which has 10 pigs each as an average. The sows are local black. It was informed that there is one Large White boar for the whole village. However, there is also a local black boar as there were black piglets.

Tieling Municipal Abattoir and Processing Plant.

At the plant are slaughtered 500 pigs/day, out of which 1/3 is processed and 2/3 are sold as hot carcasses.

The processed products are mainly sausages.

The plant is old fashioned compared to international standards. Especially the processing facilities are in a very bad shape.

New processing departments are however under construction and it will be furnished with Chinese manufactured equipment. A few pieces of stainless steel equipment (ham stirring tank, tenderizer and brine ejector) were already being installed.

Tieling Municipal Poultry Processing Plant.

In the plant are slaughtered and processed up to 6000 chicken/day.

The majority has since 1982 been exported to Japan as frozen legs, breast, feet, wings, stomach and neck.

The plant looks very neat and clean with stainless steel equipment of Chinese manufacture and with terazzo floor, tiled walls and white painted false ceiling.

Proposed Sites for the Pig Breeding Farms.

Out of the 8 sites already selected for the arrangement of pigbreeding farms 4 were visited.

The location of the proposed sites is shown in annex 7.

1) Outside Hen Dao River Town, an area which was previously occupied by the military.

2) East of Tieling city near the water reservoir and house for elderly people.

As an alternative to 2) there is another site near the reservoir.

3) Wan Tou Mountain. On the site there are some old houses being used for cattle, horses and other animals. The houses will be demolished if the site is to be used for pig farming.

4) Near Tifa City. On the area there are farming activities including breeding of pigs and chicken.

Common for the sites visited is that they all seem ideal. They are away from other agricultural and human activities and there seems to be enough flat land to arrange the farm buildings.

It was pointed out that there is adequate availability of water and electricity and that waste disposal can be solved. For some of the sites the road leading up to the site was not in an acceptable condition.

Proposed Site for the Abattoir and Processing Plant.

The plant is proposed to be located on a site in the New Industry Area south of Tieling city and between the highway and the railway line.

The site is approximately 100,000 m², almost square and is completely flat.

The site is facing a timber store to the north, the road to the east, farmland to the south, and farmland/railwayline to the west.

The connection to the highway is convenient, though the connecting road ought to be widened.

If connection to the railway is required, this could easily be established.

Being an industrial area electricity is readily available. For water supply there has to be drilled a well. There is supposed to be sufficient ground water.

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If cleaned to an acceptable standard, the waste water can be disposed of into a river parallel to and on the opposite side of the railway line.

A.1

ANNEXES

ANNEX 1

JOB DESCRIPTION

TF/CPR/89/002/11-51

- Post title:** Consultant in meat technology
- Duration:** 1 month (2 weeks in field, 2 weeks in home country)
- Date required:** 1 September 1990
- Duty station:** Beijing, Tieling (Liaoning Province) - People's Republic of China
- Purpose of project:** Strengthening the capability of enterprises, non-governmental organizations, industrial organizations and related institutions in the People's Republic of China for co-operation with foreign partners by providing short-term advisory services on specific technical aspects. The UNIDO Centre for International Industrial Co-operation in Beijing has identified a need for such advisory services at the Livestock Bureau in Tieling City, which plans to establish a slaughter-house and a meat processing plant in Xongquantun town.
- Duties:** In co-operation with the UNIDO Centre in Beijing and the Livestock Bureau in Tieling, the consultant will prepare a diagnostic report to verify the figures and findings presented by the Livestock Bureau in a pre-feasibility study and a detailed project description carried out in October 1989. The diagnostic report should have the following contents:
- Introduction
 - Background and history of the project
 - Marketing
 - Local conditions including raw material supply, fodder situation and diseases, regarding pigs and cattle in the designated area
 - Description of the project
 - Organization
 - Time for implementation
 - Investment
 - ~~Financial analysis including budget and cash flow projections~~
 - Recommendations

The consultant will stay approximately two weeks in Beijing and Tieling in order to collect the necessary information for the diagnostic report and discuss the viability of the establishment of the slaughter-house and the meat processing plant with the Livestock Bureau of Tieling, Government and local authorities, and the UNIDO Centre in Beijing. He will then finalize the report in his home country and submit twenty copies to UNIDO.

- Qualifications:** Process engineer specialized in meat technology with 5-10 years' experience in planning and design of slaughterhouses and meat processing plants.
- Language:** English, Chinese desirable
- Background:** Under an agreement with the Government of the People's Republic of China, UNIDO is operating in Beijing a UNIDO Centre for International Industrial Co-operation. The Centre acts primarily as a promoter of industrial co-operation between enterprises and institutions in China and abroad. Among others, the Centre assumes the following functions:
- Evaluation of specific proposals for co-operation submitted by Chinese and foreign partners;
 - Identification and selection of potential Chinese and foreign enterprises and institutions willing to enter into industrial co-operation;
 - Assistance to Chinese and foreign partners in preparing for and negotiating co-operation arrangements on specific projects including joint venture establishment.

The Government of China has requested UNIDO to assist in identifying a potential foreign partner for the Livestock Bureau in Tieling which is intending to establish a slaughter-house and meat processing plant for pigs and cattle. For this purpose a diagnostic report is required to verify the figures and findings contained in a pre-feasibility study which has been carried out by the Livestock Bureau. This report will form a basis to promote the project with foreign partners.

The preparation of this report is financed under a trust fund project by DANIDA. The project enables the UNIDO Centre in Beijing to assist Chinese enterprises and institutions to identify co-operating foreign partners.

ANNEX 2

DOCUMENT OF
LIAONING PROVINCIAL PLANNING AND ECONOMIC COMMISSION
(1989) No. 566

An official reply to the project of
building a meat producing and processing integrated complex

Tieling Municipal Planning Commission,

Reference is made to your Document of No. (1989) 199 "The report on presenting the project proposal of meat producing and processing factory in Tieling". After our studies, our reply is as follows:

In order to make full use of the abundant fodder resources in the northern part of our province to establish a meat producing base and improve supply for the market, we agree with you that Tieling use the UNIDO donation fund to introduce from abroad the breeding pig and the advanced technologies and equipments for industrialized pig farm which could produce 660,000 lean pigs per year and a meat processing factory which could slaughter and process 100,000 pigs and 40,000 cattle per year.

As for the investment needed by the project, in addition to the donation by UNIDO, the left part of capital should be raised by your city domestically. The fodder, energy, fuel and other things needed by the project should be settled by your city.

Once the amount of the donation by UNIDO is determined, you would go through the formalities, in terms of the investment scale, according to the relevant regulations.

October 28, 1989

DOCUMENT OF
LIAONING PROVINCIAL NATIONALITY AFFAIRS COMMISSION
(1989) No. 42

The report on presenting
"The project proposal of a meat producing and processing
integrated complex in Tieling city"

National Nationality Affairs Commission,

Tieling city of our province is the state's main grain area. which has a grain yield of 4 billion kilogram per year. Except for paying grain tax to the state, there are still 1.5 billion kilogram grain that can be used in livestock industry. The output of the livestock industry of Tieling city is 900,000 pigs and 100,000 cattle. Now the raising of pigs and cattle is the main source of income in the countryside of Tieling city. The net profit for one pig is 150 yuan, and 400 yuan for one cattle. Now the livestock industry of Tieling city still has a great potentialities of development. But insufficient capability in the meat processing, storage and transportation has halted the development of the livestock industry and has become an urgent task at present.

In order to bring about a prosperous economy to Tieling area, and to solve the problem concerning the processing and transportation of the pigs and cattle to further develop the livestock industry, we intend to build a meat producing and processing integrated complex in Tieling city.

The total investment of the project is 112,530,000 yuan, of which 70 per cent, 78,870,000 yuan, will come from the donation granted by UNIDO (equivalent to US\$21,120,000 according to the exchange rate of 3.73:1), and 30 per cent, 33,760,000 yuan, will be financed domestically.

Now we present the project proposal to you and look forward to your reply.

- Enclosure: 1. The report on presenting a project proposal of building a meat producing and processing integrated complex in Tieling city
2. The project proposal of building a meat producing and processing integrated complex in Tieling city

Liaoning Provincial
Nationality Affairs Commission

Oct. 31, 1989

Project proposal

on a meat producing and processing integrated complex

Implementing Agency: Livestock Bureau

**Presenting Agency: Tieling Planning Commission
Tieling Municipal Commission of
Nationality Affair**

28 September 1989

Chapter one

Outline

1. Project Aim: To make full use of the advantages of northern part of Liaoning Province in fodder and human resources to establish a meat producing and processing basis; to use foreign capital and introduce the advanced industrialized pig-raising technologies and processing techniques for livestock products to upgrade the traditional pig-raising and meat processing techniques; to transform the situation of selling raw materials and primitive products to producing higher quality pork, beef and finished products; to increase the export and earn more foreign currencies, and to satisfy the domestic demands.

2. Project location: The place which is chosen to be the location of the project is in the maize belt of the Song Lao plateau which is the most suitable area for raising cattle and pigs. The complex would be situated at the foot of a hill and beside a stream, facing the sunshine and back the wind.

3. Project Scale: This integrated complex includes two parts, one is the industrialized pig-raising farm and another is meat processing factory. The capacity of pig-raising farm will be 66,000 pigs per year. The meat slaughtering and processing factory consist of four workshops, that is, slaughtering, cold storage, meat processing and biological pharmacy. The slaughtering capacity is 500 pigs and 140 cattle per day. The volume of the cold storage is 5,000 tons, the processing capacity is 5 tons per day. The occupied room is 200,000 square meters.

4. Project Investment: Total investment is 112,530,000 yuan. Among them, the pig farm needs 74,660,000 yuan; the meat slaughtering and processing factory need 37,870,000 yuan. The fix asset investment is 92,530,000 yuan; the flowing asset investment is 20,000,000 yuan. Among the fix asset investment, the construction expenditure is 27,390,000 yuan; the equipment expenditure is 34,500 000 yuan; the breeding pigs is 9,840,000 yuan; the design, training and installation is expected to need 15,190,000 yuan; the unpredicted expenditure is 5,610,000 yuan.

5. Funds mobilization: Applying 78,770,000 yuan aid from UNIDO (\$21,120,000, based on the 3.72:1 exchange rate), domestic fund is 37,760,000 yuan (accounting for 30 per cent).

6. Terms of construction: It will take two years to complete the whole project. The preparatory work will be finished by 1990. From the beginning of 1991, the construction work will start and the project will be put into operation at the end of 1992.

7. Economic benefit: Take the 6th year from the beginning of the investment for example, the total revenue can be 181,630,000

yuan, among which the pig farm can be 29,780,000 yuan, and the meat slaughtering and processing factory will be 151,850,000 yuan. The profit will be 31,530,000 yuan. The state and local taxes will be 3,045,000 yuan. The foreign currency obtained from export can be US\$4,620,000 (equal to 13,860,000 yuan).

8. Payoff period: After the project enter into operation, 47,280,000 yuan can be earned by the factory from profit, depreciation charge and that part of RMB equivalent to the foreign currency earned from export, the payoff period on the investment would be 2.4 years.

9. Conclusion: To set up a meat producing and processing integrated complex in Tieling, which is superior in natural resources, will have a outstanding economic and social benefit.

Chapter two

The necessity and feasibility of the project

1. The necessity of the project:

(1) To provide a model of industrialized pig-raising and push forward the renovation of the traditional pig-raising techniques by means of introducing advanced pig-raising techniques.

(2) Raising the meat processing level and the competitive ability in the market by means of importing advanced processing technologies and equipments.

(3) Increasing the export to get more hard currency and, at the sametime, further meeting the needs of the urban and rural people's everyday life by means of the setup of a meat producing base through absorbing foreign capital and introducing good breeds.

(4) Taking the advantage of the livestock resources in the northern area of the Liaoning province, to develop high-benefit producing and processing project, to increase the employment and to increase the national and local returns.

(5) Tieling city is located in the northern area of Liaoning Province. It's a poor area and a concentrative-lived minority area. There are thirty minorities in this area, such as Manchu, Mongolia, Korea. The population of the minority amounts to 620,000, which accounts for 18.1 percent of the whole population of Tieling. Tilling's economy develops slowly, the living standard is comparatively low. It's urgent to widen the production road and explore the channels to rich.

2. The feasibility of the project:

(1) Tieling is the state's commodity grain base and meat producing base. It's abound in maize and soybean. The energy and protein fodder is abundant and their price is comparatively low. And 3.5 billion kilogram straw and agricultural side-line products

can be used as coarse fodder to develop livestock.

(2) The Manchu and Mongolia minority people has a long history of raising livestock. The total pig output in Tieling city is 2.2 million per year. The total cattle output is 300,000 per year. Fifty villages in which the minority people have a big proportion raise 2000 and more cattle per year, which accounts for 53 per cent of the whole cattle raised in Tieling city.

(3) Tieling is located near the cities' group of the central part of the province and is also coal and electric energy base. It's the meat-producing place in a lack-of-meat province. The market is very large and is very near.

(4) The meats is a little bit tight in the international market. The future for the price is bright. Going up to the Heilongjiang Province, we can do border trade. Going down to the south, we can export our products by ways of such ports as Dalian, Dandong, Yingkou, Qinhuangdao Island, etc.

(5) Laborer resource is sufficient in Tieling. The technical strength is qualified to organize a large-scale meat producing and processing integrated complex.

(6) The place selected for the project is located along the Zhong-Chang Railway line and Shenyang-Dalian highway. The communication is convenient. The water and power is available.

Chapter Three The scale of the project

1. The scale of the industrialized pig-raising farm:

- (1) Enclosed piggery: 36,000 square metres;
breeding pigs: 450;
F1 breeding pigs: 4,158;
Carcass yields: 66,000.
- (2) Fodder processing workshop: 1,965 square metres;
Annual output: 12,000 tons.
- (3) Fecal sewage treatment system: 350 tons per day.
- (4) Office and living building: 1,000 square metres;
Some auxiliary facilities for water, electricity, gas,
roads, enclosing walls, and etc.

2. The scale of the meat slaughtering and processing factory

- (1) Enclosed slaughtering and cutting house: 2,300 square metres
capacity: 500 pigs and 100 cattle per day.
- (2) Cold storage: 7,000 square metres;
Volume: 5,000 tons.

- (3) Workshop for cooking meat: 2,750 square metres;
Capacity: 5 tons per day.
- (4) Biology pharmaceutical workshop: 1,000 square metres.
- (5) Office and living building: 1,000 square metres.

Chapter Four Investment Budget and Funds Raising

1. Investment budget:

Total investment: 112,530,000 yuan; Fixed assets investment: 92,530,000 yuan, 82.2 per cent of the total investment. Among the fixed assets, the breeding animals needs 9,840,000 yuan, 10.6 per cent of the fixed assets; construction: 27,390,000 yuan, 29.6 per cent of the fixed assets; equipment: 34,500,000 yuan, 37.3 per cent of the fixed assets. Flowing funds: 20,000,000 yuan, 17.8 per cent of the total investment.

2. Funds raising:

Applying to UNIDO for a donation of 7,877,000 yuan (US\$21,120,000, according to the exchange rate of 3.73 yuan to 1.00 US dollar). 37,700,000 yuan, 30 per cent of the total budget, will be raised domestically by Liaoning Provincial Agricultural Development Investment Corporation, Agricultural Investment Corp. and Tieling city.

Chapter Five The Main Purchasing

1. Breeding pigs:

- (1) Chester whites, Landrace, and : 450:
- (2) F1 breeding pigs: 4,158.

2. Equipments:

- (1) Enclosed pig-raising equipments (automatic fodder-feeding, drinking water, fence, and etc)
- (2) 2 sewage separating machines
- (3) 1 set of fodder processing equipments
- (4) 1 set of automatic production line for slaughtering pigs
1 set of automatic production line for slaughtering cattle
- (5) 1 set of equipments for cutting pigs
- (6) 1 set of equipments for producing sausages
- (7) 1 set of equipments for pickled products in soy sauce
- (8) 1 set of equipments for continuously extracting oil
- (9) 1 vacuum drying machine
- (10) 1 set of equipments for biological pharmacy
- (11) 1 set of equipments for laboratory
- (12) 1 ten-ton boiler, 1 six-ton boiler, and other equipments concerning water, electricity and transportation

3. Materials:

- (1) Steel: 2,400 tons
- (2) Woods: 2,500 cubic metres
- (3) Cement: 12,000 tons

Chapter Six
Economic benefit analysis

1. Economic benefit of the enterprise:

After the project is put into operation, the annual output value will be 181,630,000 yuan, the annual profit will be 31,530,000 yuan, foreign currency earned per year will be US\$4,620,000 (equal to 13,860,000 yuan), the total profit will be 45,390,000 yuan. Among them, the pig-raising farm achieve an output of 29,780,000 yuan, a profit of 3,260,000 yuan, and US\$4,620,000; and the meat processing factory will achieve an output of 151,350,000 yuan, and a profit of 28,270,000 yuan.

2. Social benefits:

- (1) Increasing 600 new posts for employment, of which 100 posts comes from pig-raising farm and 500 comes from meat processing factory; increasing service income of 2,200,000 yuan.
- (2) Increasing state and local taxes by 3,045,000 yuan, among which, 1,605,000 yuan comes from pig farm and 1,440,000 comes from meat processing factory.
- (3) The local people will earn 8,000,000 yuan more than before from raising the cattle, and 5,100,000 yuan more from raising pigs.

3. Payoff period of the investment:

After the project enters into operation, the annual profit would be 45,390,000 yuan, the depreciation charge will be 1,890,000 yuan. So the payoff period of the total investment, 112,530,000 yuan, will be 2.4 years. The pig-raising farm will take 4.4 years to pay off its investment; and the meat processing factory will take 1.3 years to pay off its investment.

Chapter Seven
Coordination and administration

1. This project will be undertaken by Tieling livestock Bureau, under the direct leadership of the municipal government.

2. After the project is approved by the relevant authorities, Tieling city will set up a leading group for the project, and the head of the group will be the person who is in charge of these affairs in the municipal government. The leading group will be responsible for the specific work concerning the preparation and the construction of the project.

Attached list: Table 1, Budgetary estimate on investment.
Table 2, Budgetary estimate on economic benefit.

Table 1 Budgetary Estimate On Investment
Unit: 10,000 yuan

Amount of Money	Total Investment	Investment on Pig Farm	Investment on Meat Processing Factory
Total	11,253	7,466	3,787
Fixed Assets Investment	9,253	6,466	2,787
Including:			
Construction	2,739	1,499 (37,473m)	1,240 (14050m)
Equipment	3,450	2,801	649
Breeding Stock	984	984	
Design, Training, Installation	1,519	874	645
Unforeseeable Expenditure	561	308	253
Floating Asset	2,000	1,000	1,000

Table 2 Budgetary Estimate on Economic Benefit
Unit: 10,000 yuan

Amount of Money	Total	Pig Farm	Meat Processing Factory	Remarks
Value of Output	13,163	2,978	15,185	
General Cost	14,883.5	2,491.5	12,312	
Gross income	304.5	160.5	144	
Profit	3,153	326	2,827	Pig farm has US\$4,620,000, increasing the income by 13,860,000 yuan

Table 3 Payoff Period of Investment

Item	Integrated Complex	Pig Farm	Meat Processing Factory
Total Investment	112,530,000	74,660,000	37,870,000
Fixed Assets Investment	92,530,000	64,660,000	27,870,000
Annual Returned Funds	Total 47,280,000	17,120,000	30,160,000
	Depre- ciation 1,890,000		1,890,000
	Profit 45,300,000	17,120,000	23,270,000
Payoff Period on Total Investment	2.4 years	4.4 years	1.3 years
Payoff period on Fixed Assets Investment	2.0 years	3.8 years	1.0 years

MEMORANDUM OF UNDERSTANDING

Between

TIELING MUNICIPAL ANIMAL HUSBANDRY BUREAU LIAONING PROVINCE

and

INTERCOOL FOOD TECHNOLOGY LTD.

Dr. Chen Sheng, the representative from Tieling Municipal Animal Husbandry Bureau, visited Denmark during the period 17.9.90 to 22.9.90 on the initiative of UNIDO to discuss with Intercool Food Technology Ltd. the common interest in establishing an integrated pork project in Tieling, Liaoning Province.

The project should be based on the most recent technology and be planned to produce pigs and pork of a quality which will comply with the highest international standards.

It is agreed that the project should consist of three main parts:

1. **Pig Breeding**

Approx. 4,000 sows, 10,000 own pigs/year, 70,000 contract farmed pigs/year, feed mill.

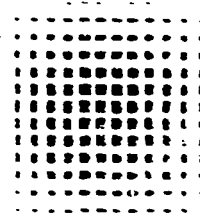
2. **Slaughterhouse**

Capacity: 100,000 - 150,000 pigs/year. Slaughtering, by-products, refrigeration etc.

3. **Meat Processing**

Fresh and cooked meat.

This is preliminarily described in "Document of Liaoning Provincial Planning and Economic Commission (1989) No 566".



All facilities should be of a standard which will enable the project to export the meat to all international markets if the relevant approvals are given.

The total budget will be determined during a more detailed study.

Both parties are interested in a close cooperation and both parties agree to investigate the possibility of a joint venture.

It is the intention that Intercool Food Technology will be a minor shareholder in the beginning. If the relevant approvals to export are given by Japan, USA etc., Intercool Food Technology will be willing to increase its shareholding. In the meantime, both parties shall make efforts to find financing in China and abroad to establish the project.

In October 1990, a representative from Intercool Food Technology will visit Tieling on the initiative of UNIDO to prepare a diagnostic report to verify existing figures and findings and to further discuss the project.

Copenhagen, 21 September 1990

TIELING MUNICIPAL ANIMAL HUSBANDRY BUREAU
LIAONING PROVINCE

(signed)

INTERCOOL FOOD TECHNOLOGY LTD.

INTERCOOL
FOOD TECHNOLOGY A/S
16, Rådhuspladsen
DK-1550 Copenhagen V, Denmark
Phone: +45 - 1 - 12 31 58

(signed)

ANNEX 4

LIST OF PERSONS

Participants in summing-up meeting 1990.10.18:

- | | | |
|----|------------------------------------|-------------------------------------------|
| 1. | Miss Liu Guo Fang | Tieling Municipal MOFERT |
| 2. | Mr. Chen Guang Da
Vice Director | Tieling Municipal Planning
Commission |
| 3. | Mr. Yan Han | Tieling Municipal Planning
Commission |
| 4. | Mr. Chen Sheng | Tieling Municipal Livestock
Bureau |
| 5. | Mr. Liu Zheng Yuan | Tieling Municipal Livestock
Bureau |
| 6. | Mr. Liu Shaoku | Tieling Municipal Planning
Commission |
| 7. | Mr. Wang Yong Duo
Director | Tieling Pig Slaughtering Plant |
| 8. | Mr. Hen Guang Yu
Director | Tieling Municipal Nationality
Committe |
| 9. | Mr. Yao Yuzhen | Tieling Municipal MOFERT |

LIAONING PROVINCIAL COMMISSION OF
FOREIGN ECONOMIC RELATIONS AND TRADE
THE ASSOCIATION OF FOREIGN INVESTMENT
ENTEPRISE OF LIAONING PROVINCE, CHINA

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692217

ANNEX 5

RECIPE, FEED

Feed Portion for slaughter pigs in different time:

Weight of pigs:

Components:	1-5 kg	5-10 kg	10-20 kg	20-60 kg	60-90 kg
1. Maize Meal	47%	46,1%	58%	58%	60%
2. Sorghum		18%	5%		
3. Soybean Meal	25%	27.8%	20%	16%	15%
4. Cooked Soybean	10%				
5. Fish Meal	12%	7.4%	7%	6%	
6. Wheat Shells				5%	5%
7. Rice Shells				6%	5%
8. Sorghum Shells			6.8%	5%	10%
9. Maize Stem Meal			2%	3%	3.5%
10. Sugar	5%				
11. Yeast	0.5%				
12. Bone Meal	0.5%	0.4%	0.9%	0.7%	0.7%
13. Sea Shell Meal					0.3%
14. Salt and Other Additives		0.3%	0.3%	0.3%	0.5%

COPY OF HEALTH CERTIFICATE

Quote:

19/10/1990

Brief Introduction About Disease of Pigs In Tieling Liaoning, China.

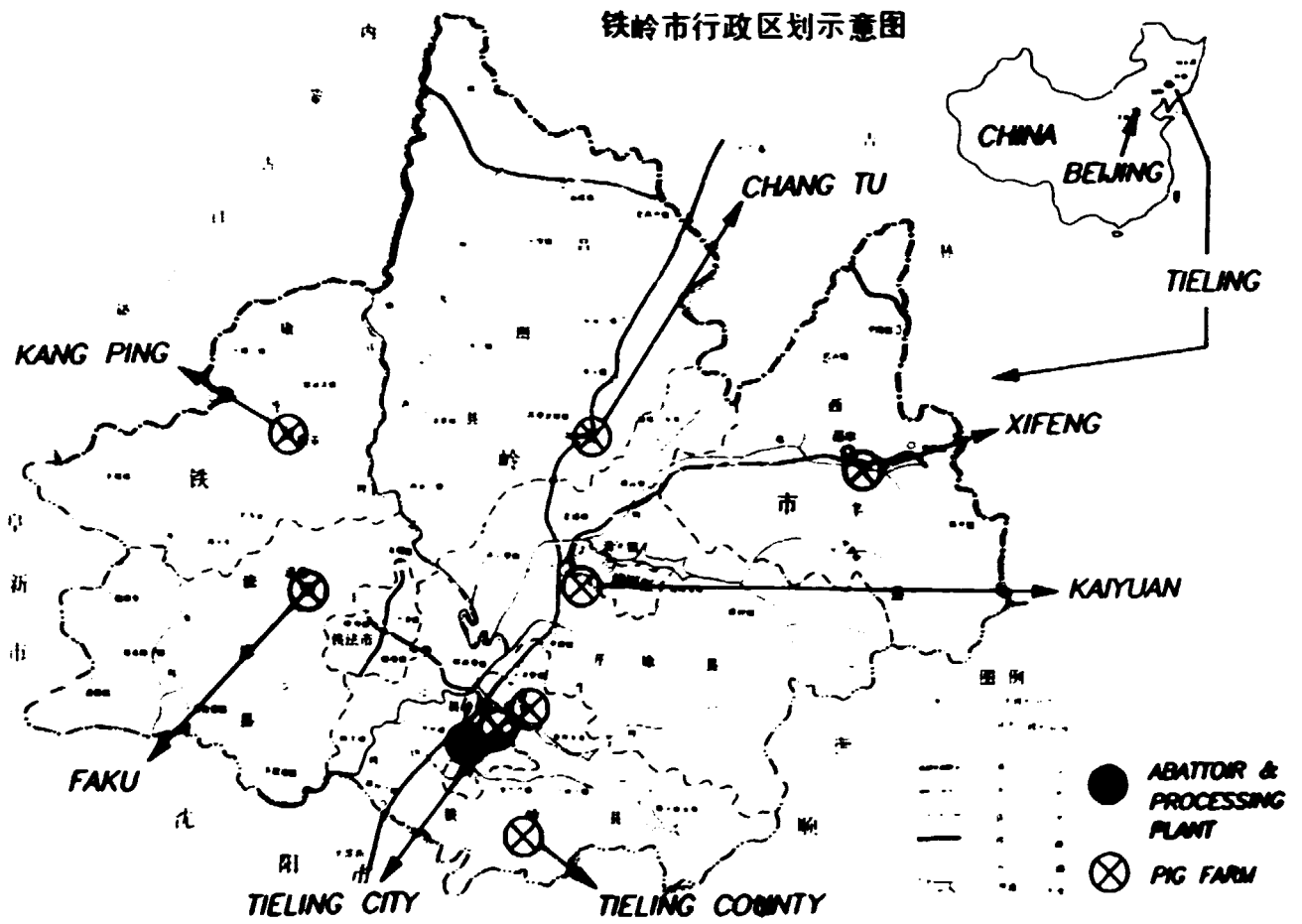
Infectious disease of pigs in Tieling has never happened since 1949, such as foot and mouth, wool-sorters, blister, blackleg, hydrophobia, and diamond-skin diseases. But pigs sometimes get commoncold, bronchities and pulmonary disease in early spring and later autum.

For preventing the disease from happening, some measures have been taken, like piklit anemia disease shich can be injected with preparation of Fe-Co. And vitamin E can be taken or shot for the disease of white skin.

Signed
Tieling Livestock Bureau

Unquote.

MAP OF TIELING



A.21

ANNEX 8

FOTOS



Family Farm in Hen Dao River Town





Family Farm In Hen Dao River Town



State Owned Farm In Kaiyuan City



State Owned Farm In Kayuan City





State Owned Farm In Kayuan City





Family Farm In
Jingou Town



Family Farm, Faku County





Two Possible Sites For Breeding Farms East Of Tieling City



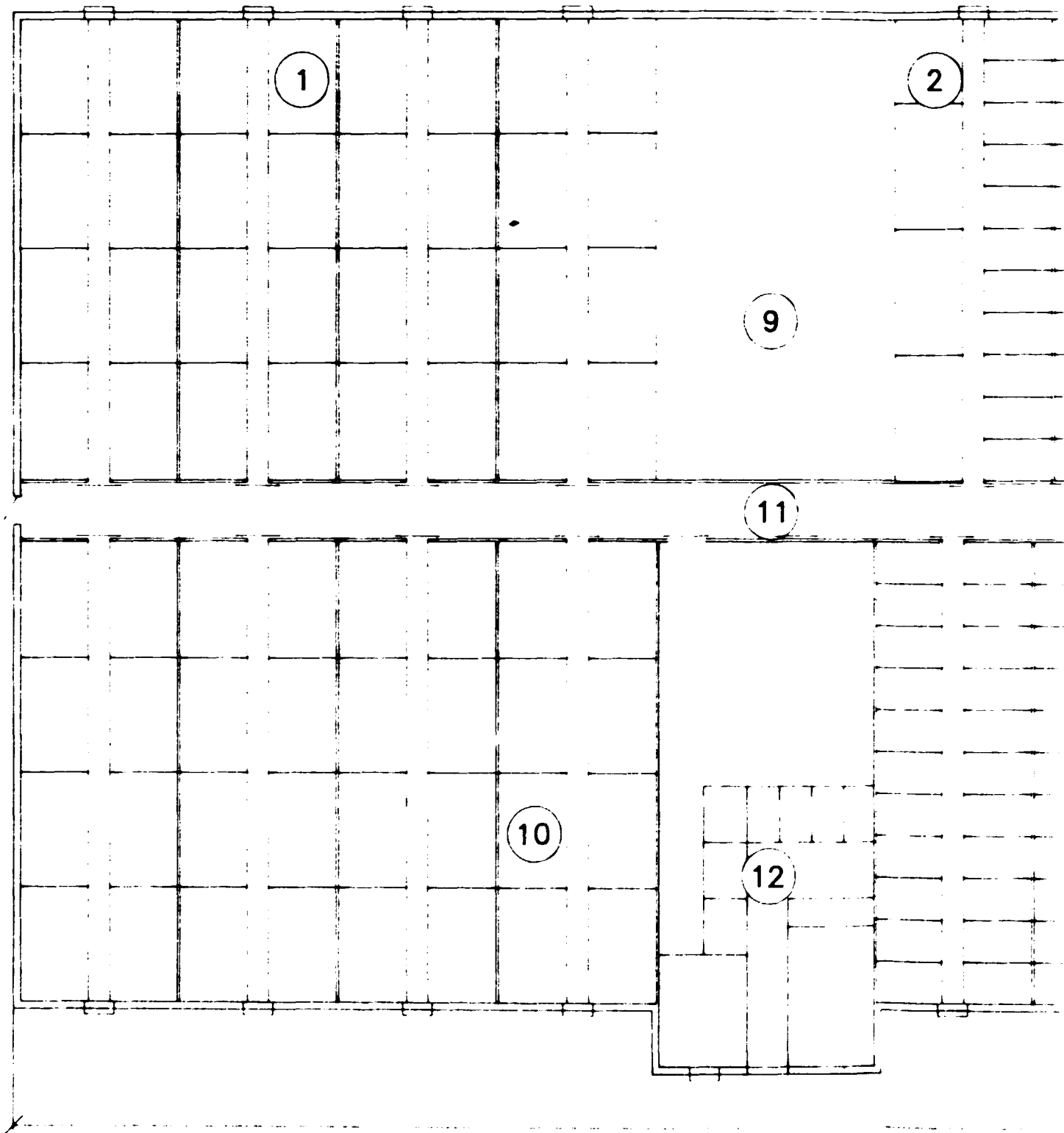


Towards North

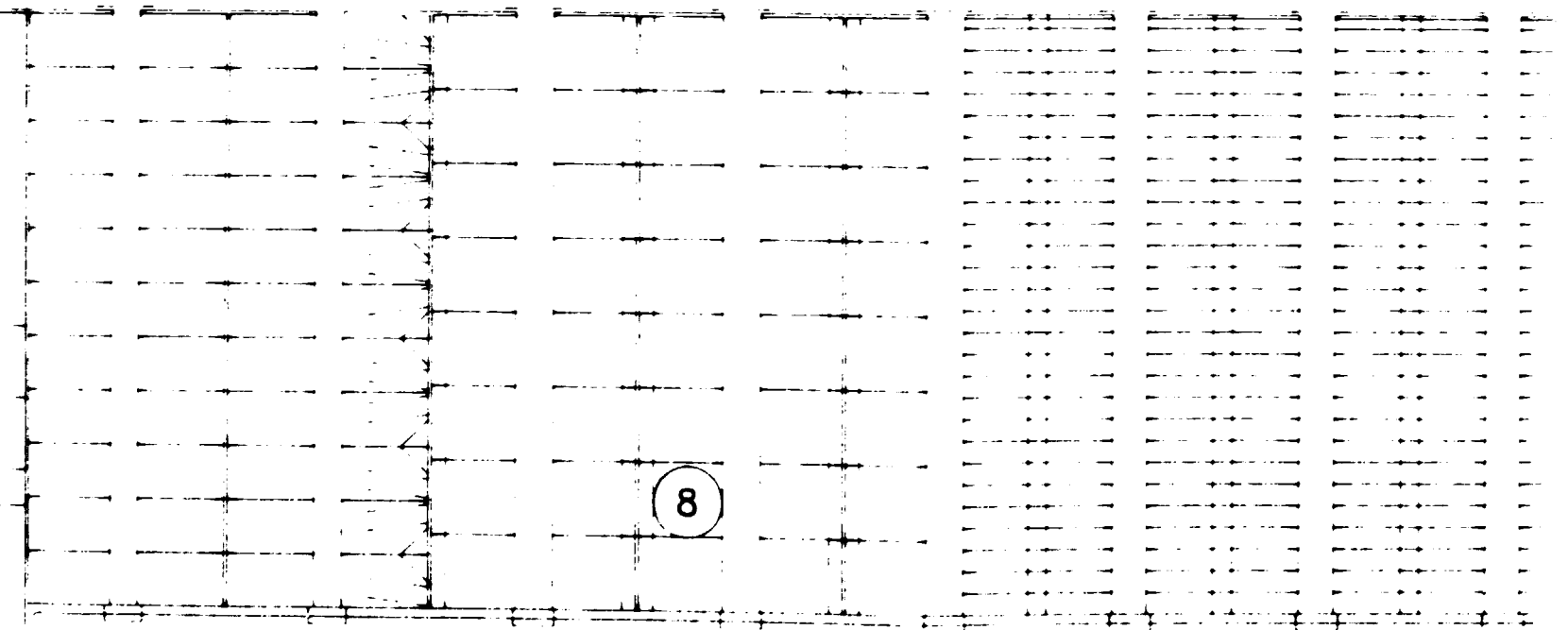
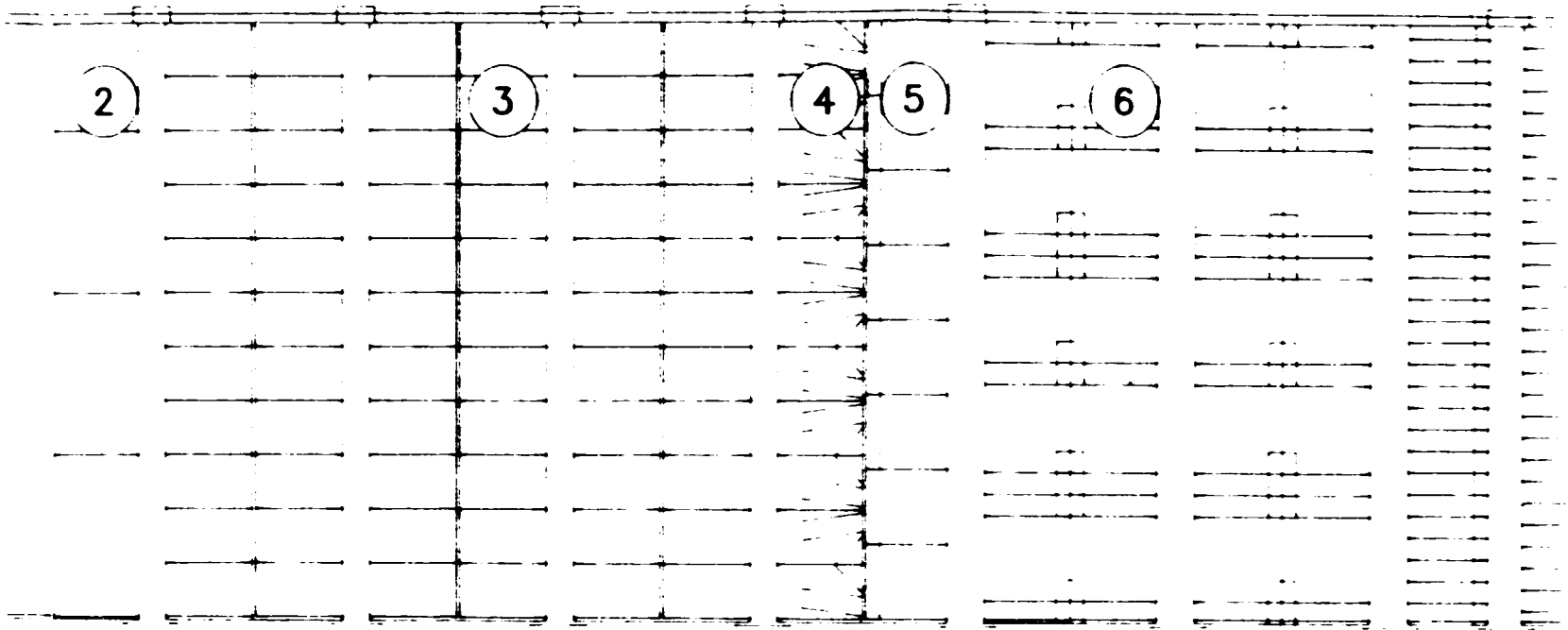
Site For Abattoir and Processing Plant

Towards South



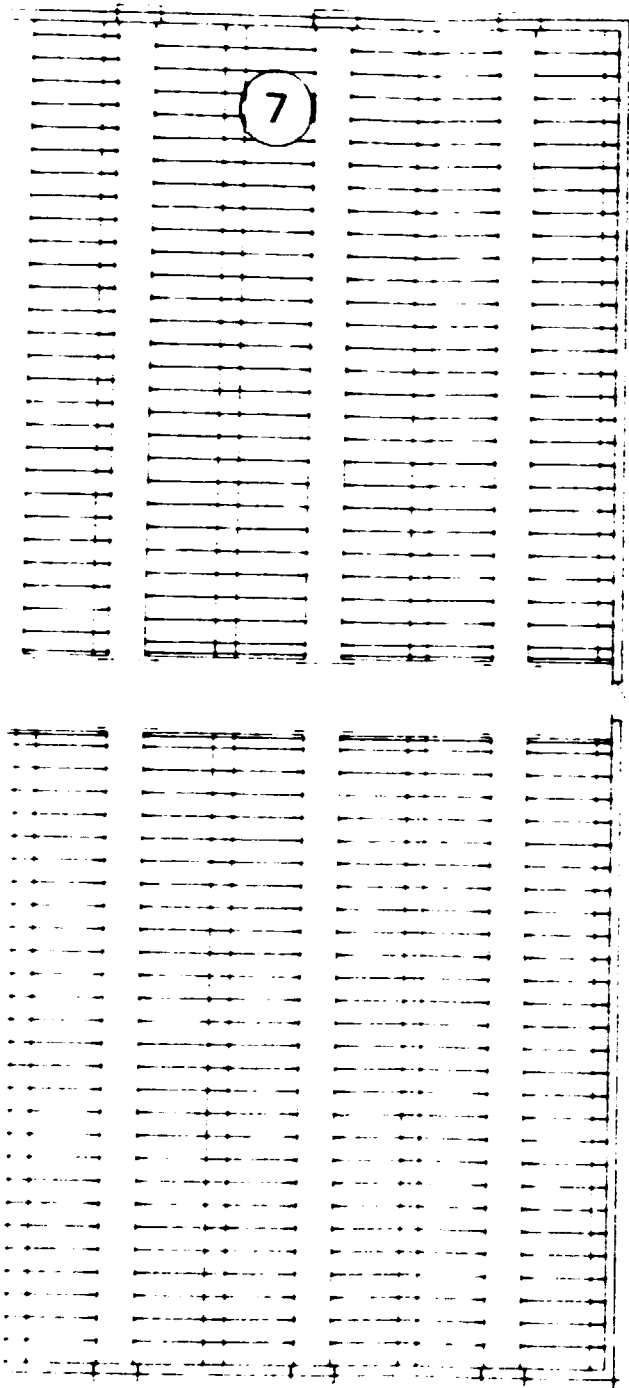


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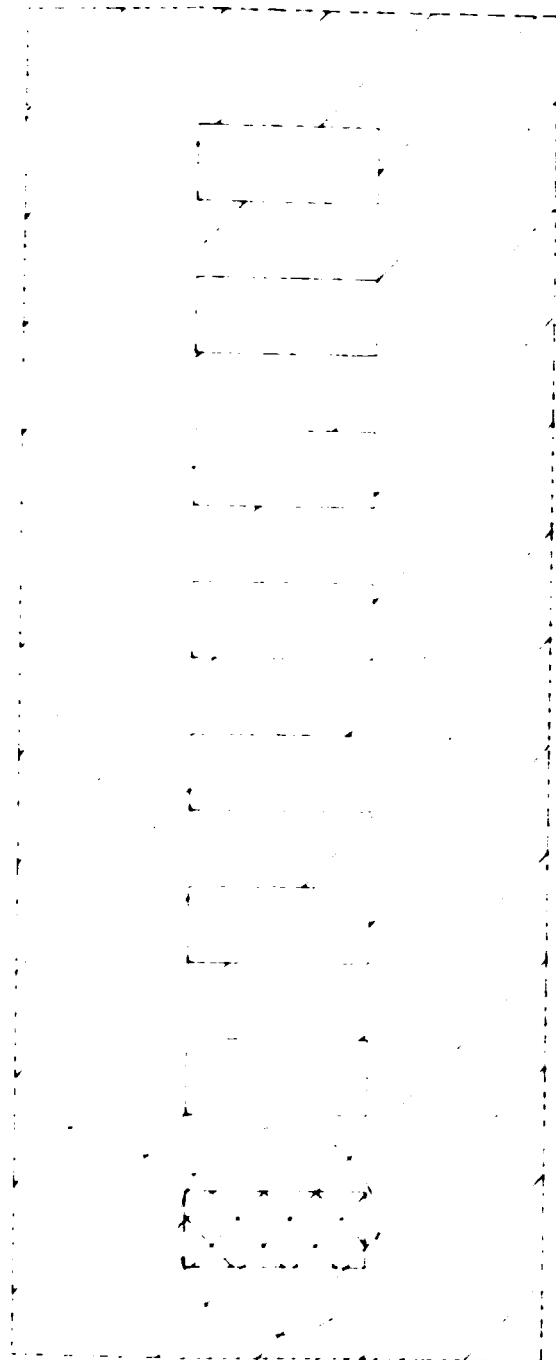


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SECTION 3

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SITE PLAN



- 1 FATTENING PENS FOR PIGLETS
- 2 OBSERVATION PENS FOR PIGLETS
- 3 SOWS WITH PIGLETS
- 4 FARROWING SOWS
- 5 YOUNG SOWS
- 6 MATING PENS
- 7 PREGNANT SOWS
- 8 SOW BREEDING
- 9 FEED PREPARATION
- 10 PRE-MIX AUTOM.
- 11 CORRIDOR
- 12 ENTRANCE, OFFICE, CHANGE

SECTION 4

TIELING — CHINA
FARM FOR SOWS

80.000 PIGLETS/YEAR
LAYOUT



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SCALE: 1:200

DRAWN: EST/AHA

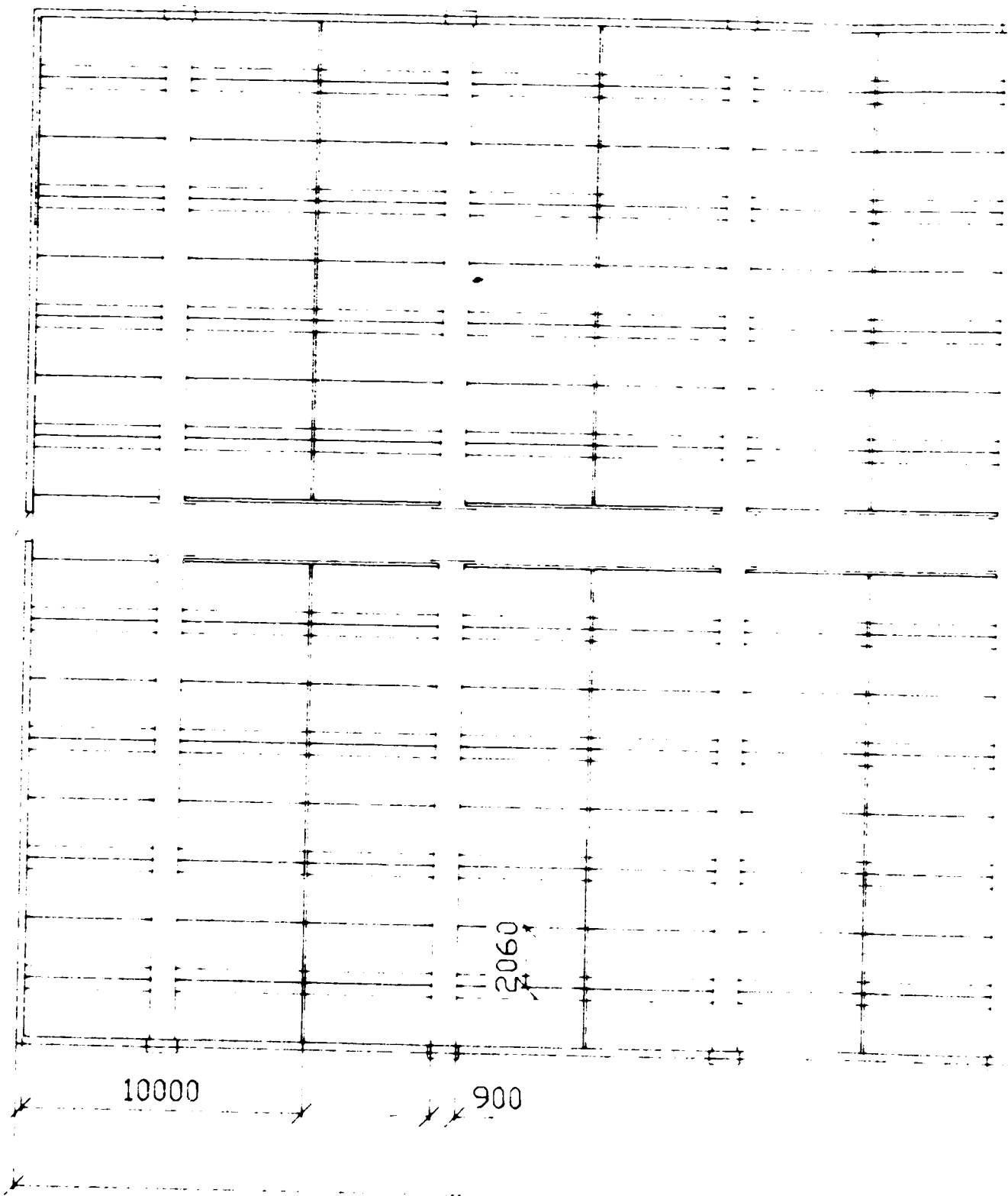
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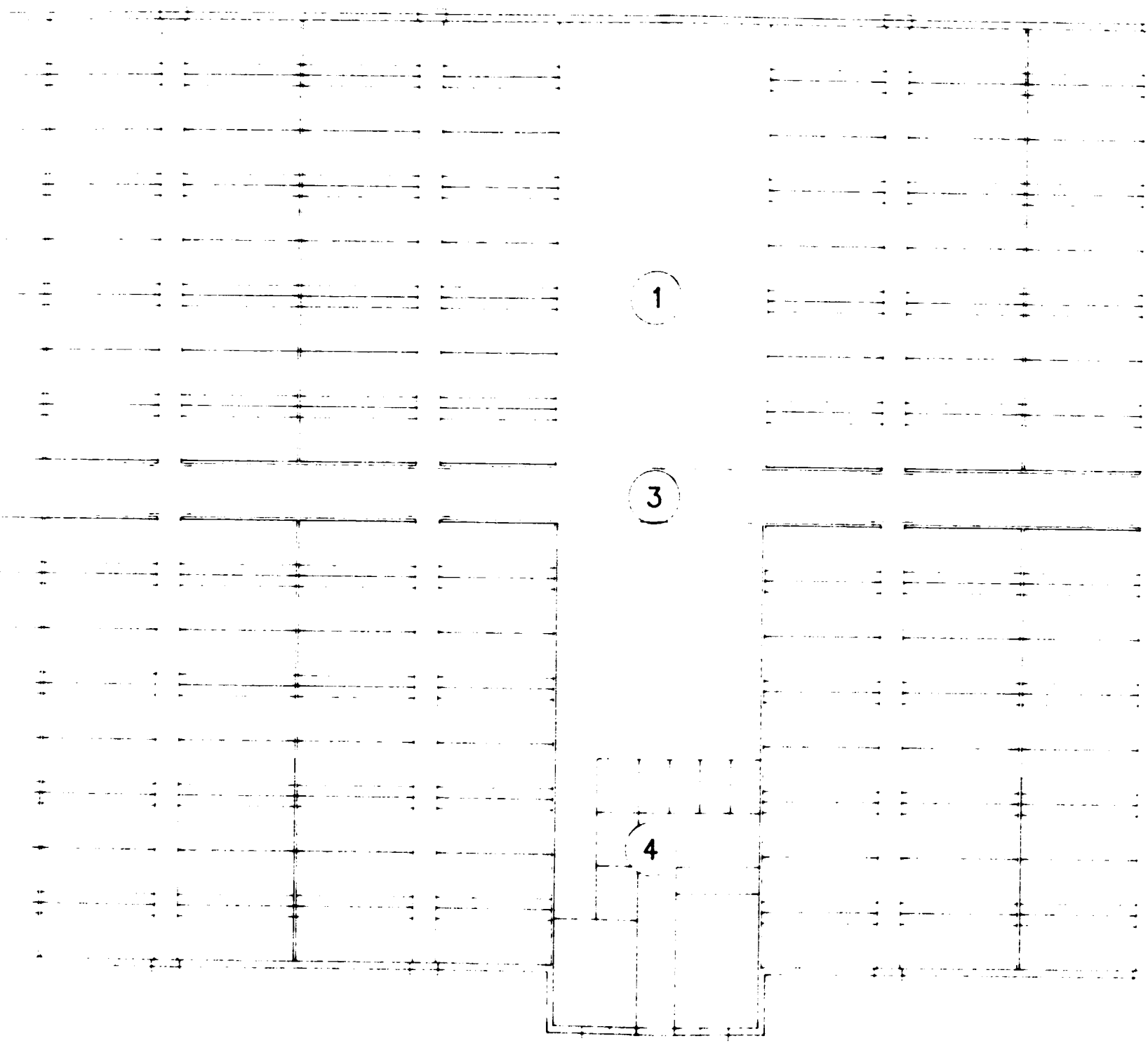
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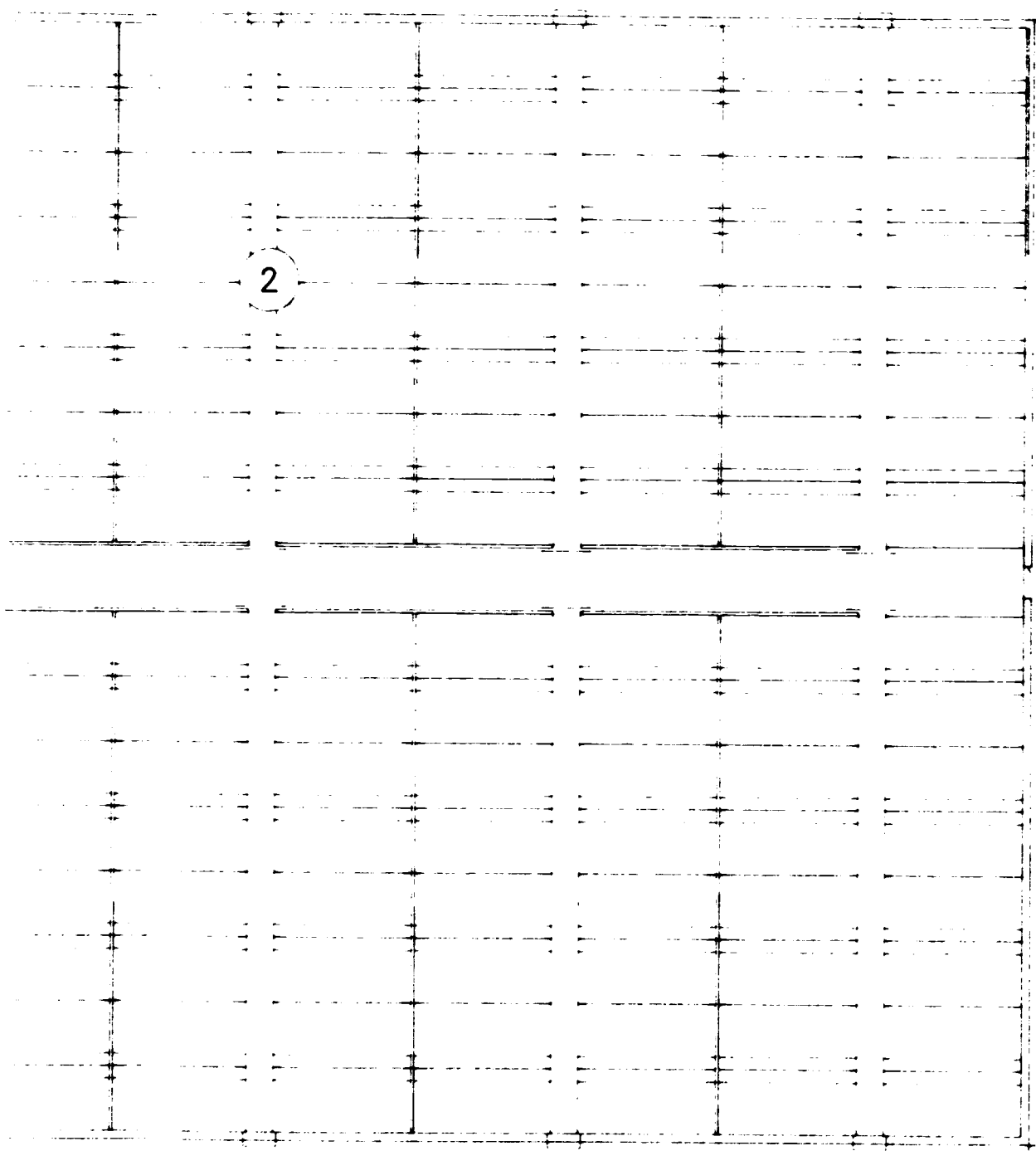


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- 1 FEED PREPARATION
- 2 PIG PENS
- 3 CORRIDOR
- 4 ENTRANCE, OFFICE, CHANGE

SECTION 4

TIELING — CHINA FATTENING FARM FOR PIGS

10.000 SLAUGHTER PIGS/YEAR
LAYOUT



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

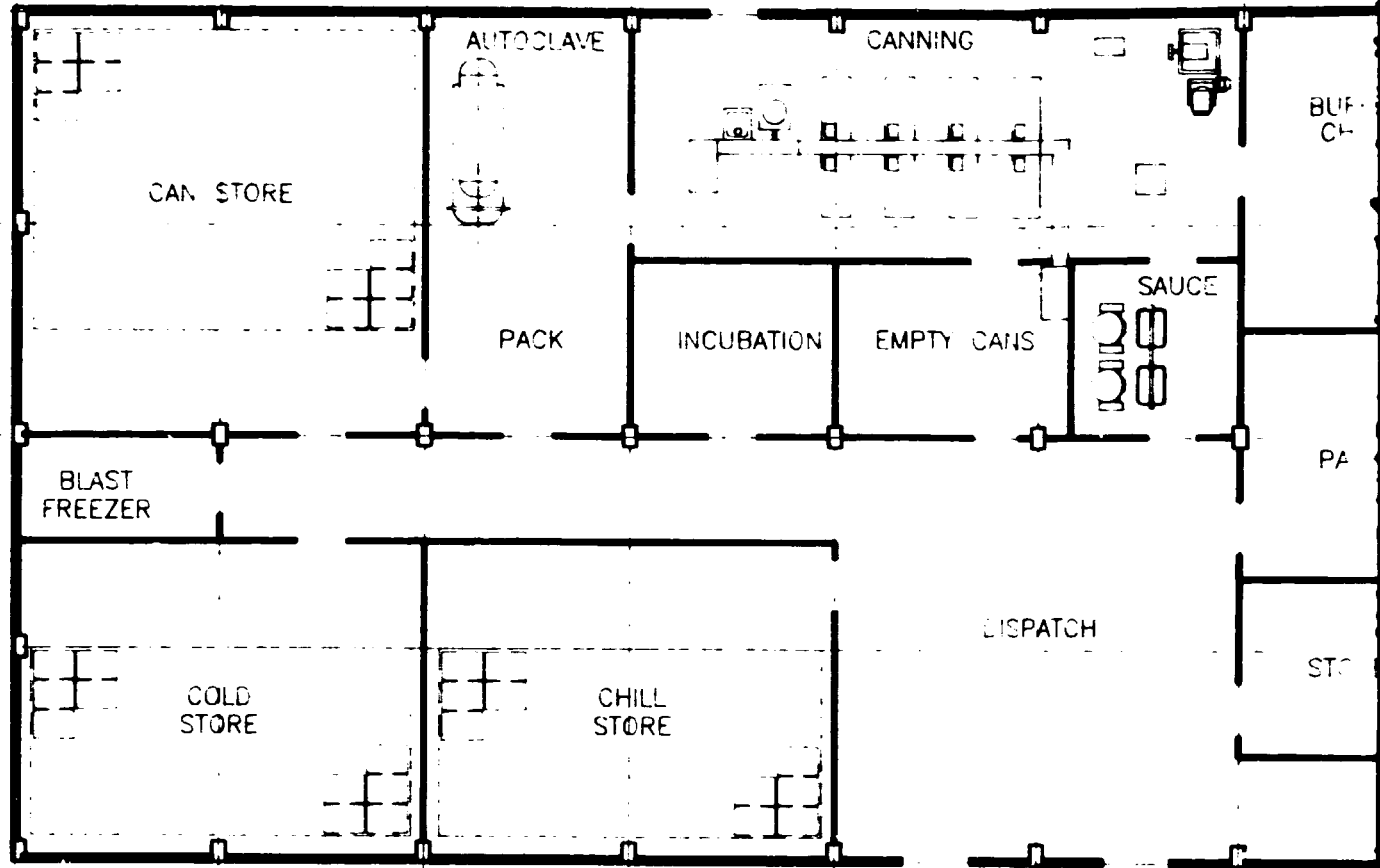
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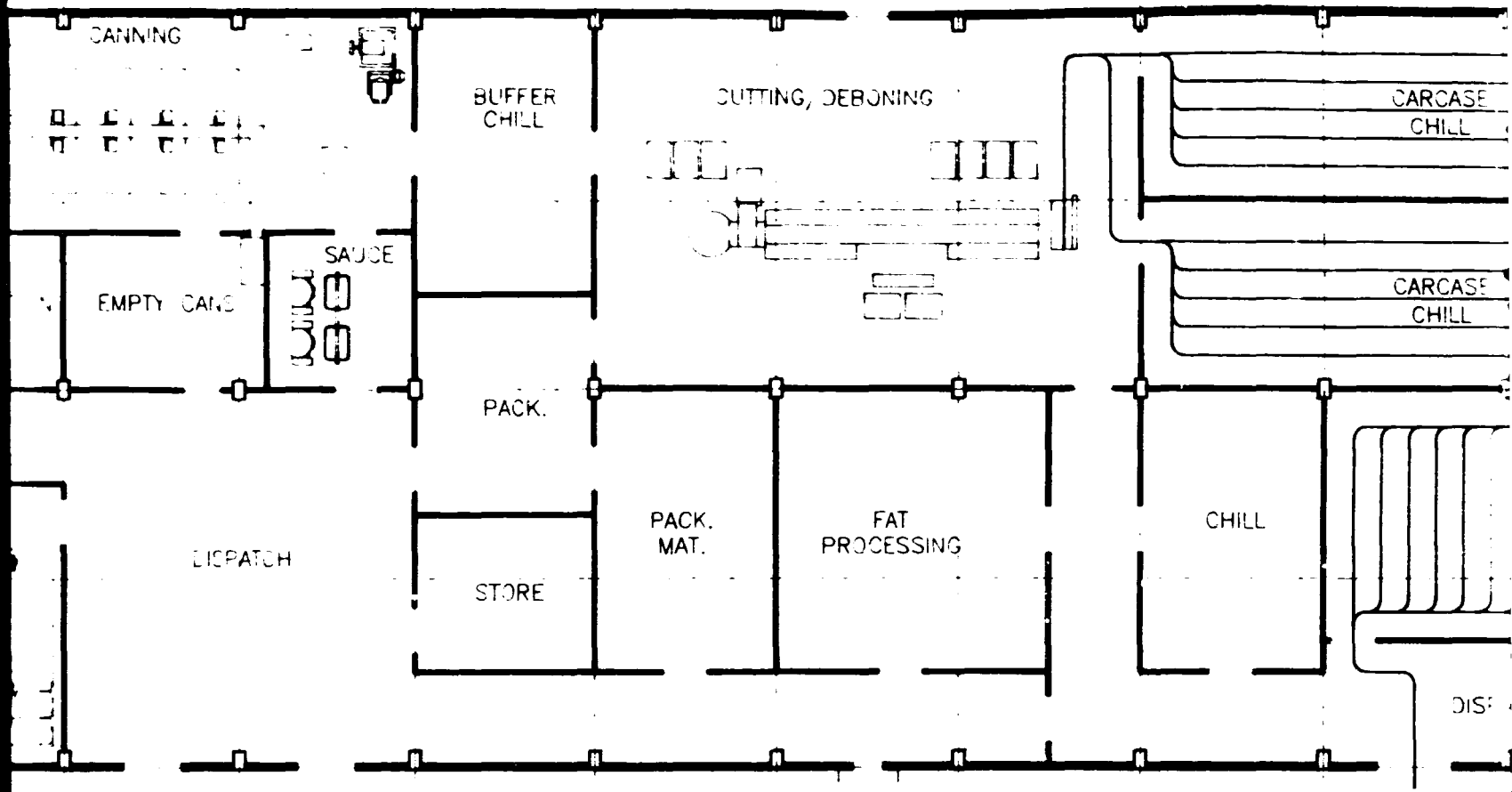
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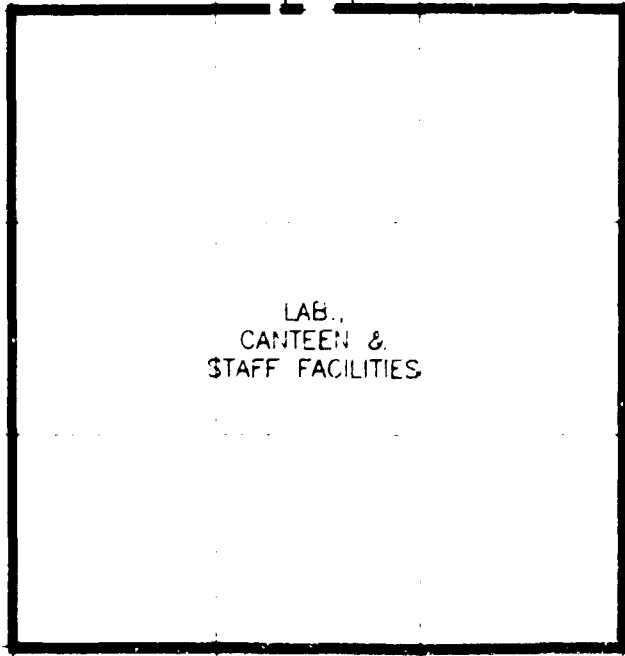
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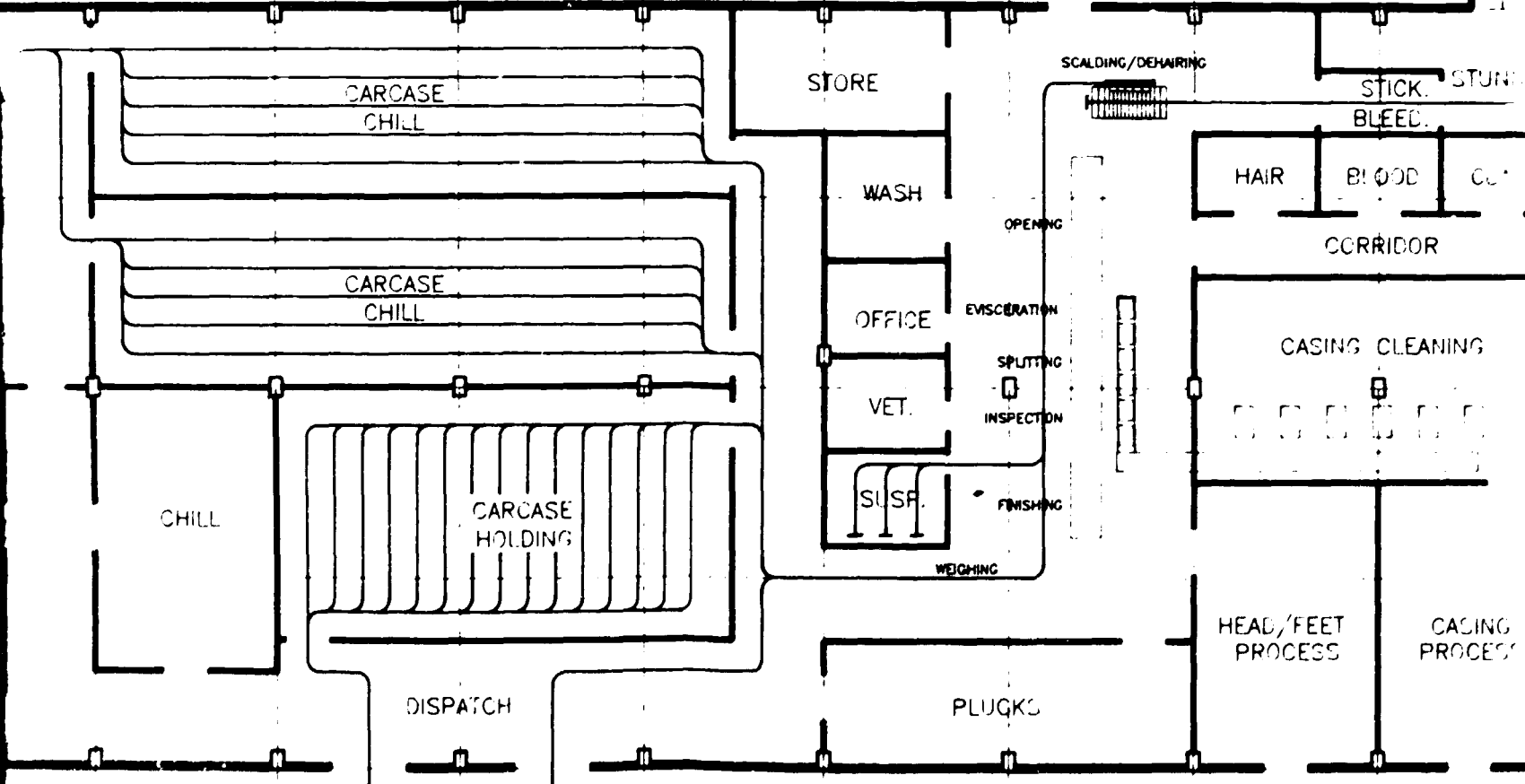
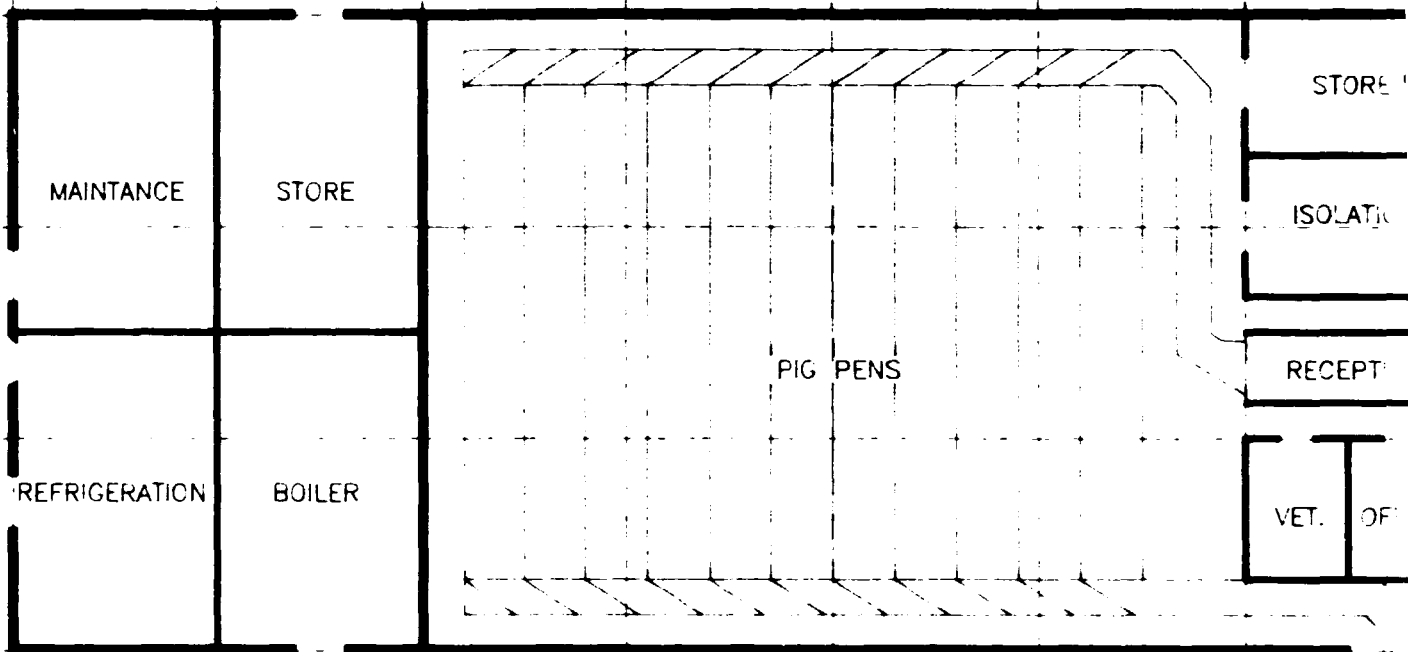


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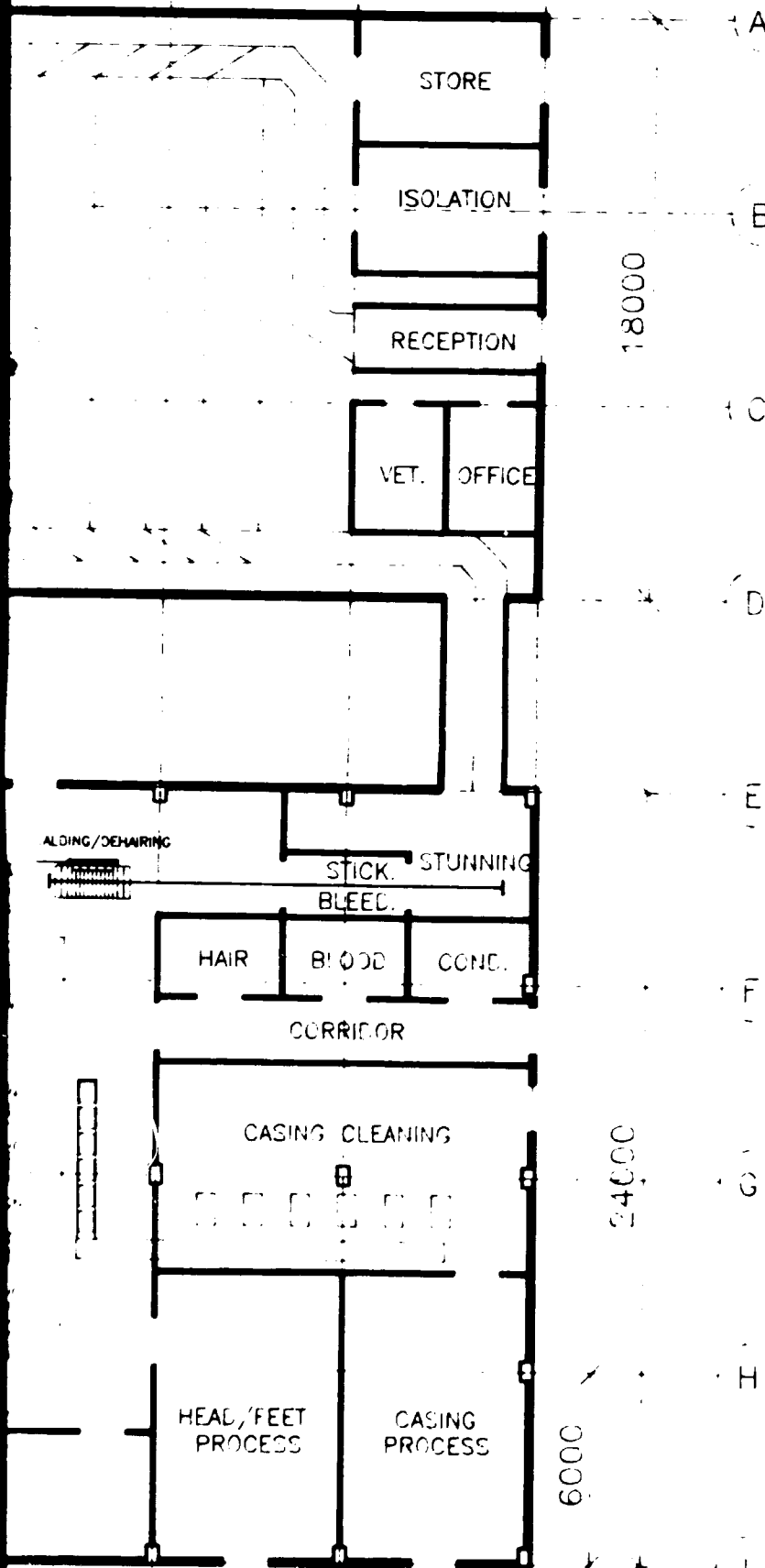
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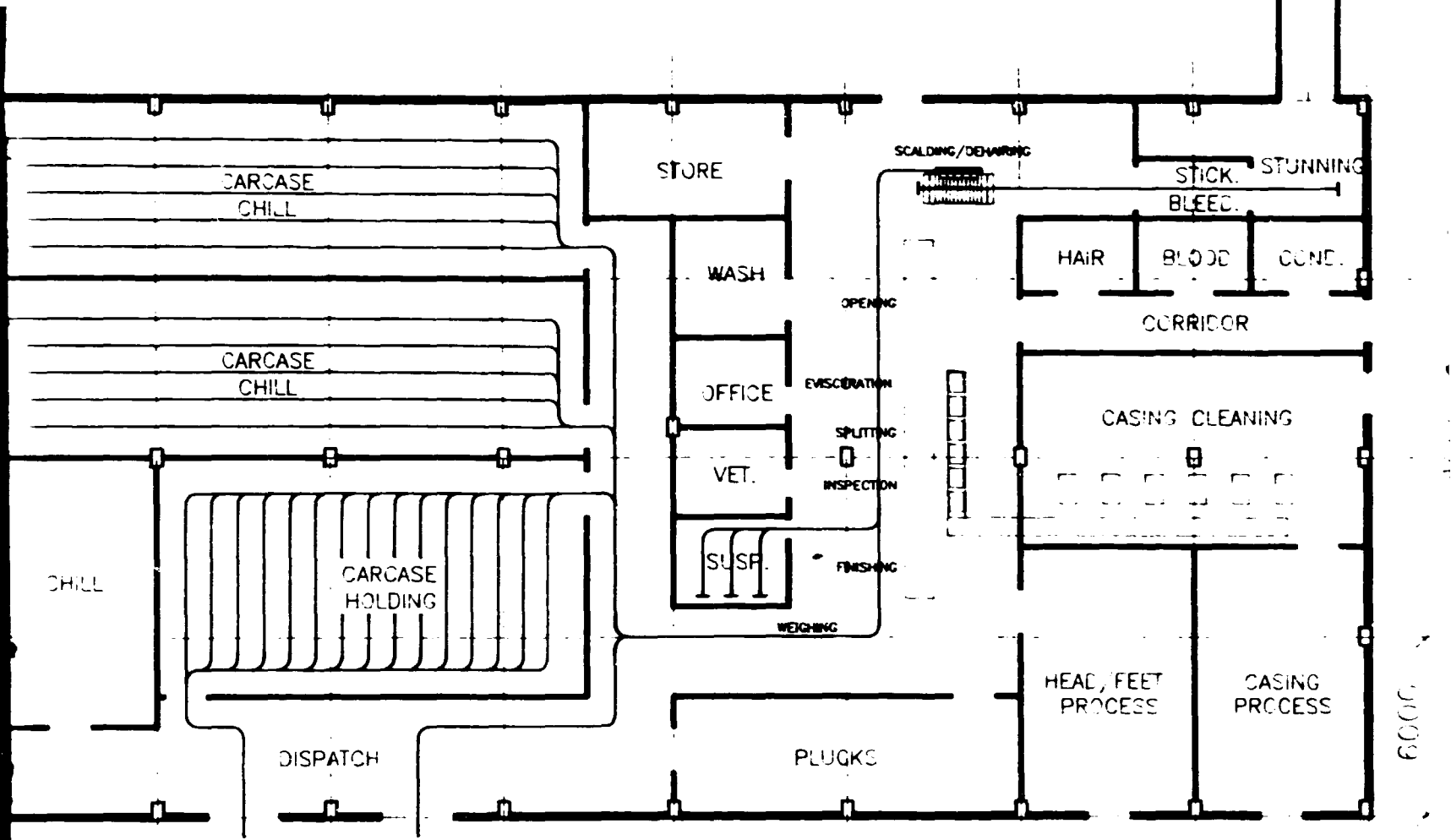
SECTION 3

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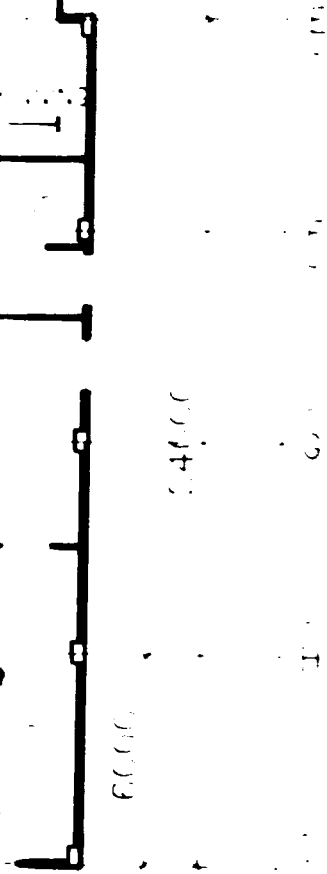
SECTION 4





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SECTION 6

TIELING — CHINA
 PIG ABATTOIR AND PROCESSING PLANT

LAYOUT



UNITED NATIONS
 INDUSTRIAL DEVELOPMENT ORGANIZATION

SCALE: 1:200

DRAWN: EST/AHA

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DATE 90.11.27

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