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# FEASIBILITY STUDY REPORT
# ON
# ALUMINA REFRACTORIES MFG PROJECT
# IN
# THE REPUBLIC OF THE PHILIPPINES

DECEMBER 1990

UNITED NATIONS INDUSTRIAL
DEVELOPMENT ORGANIZATION

<u>C O N T E N T S</u>

CHAPTER

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# I. SUMMARY

## 1.1 Project Background and History

Refractories are fundamental materials indispensable for many industries using high temperature. In the Philippines, the demand for refractories is expected to increase in keeping pace with development of industry.
There are five manufacturers of basic and alumina refractories in the Philippines. Among them, Refractories Corporation of the Philippines (herein-after referred to as RCP) manufactures basic refractories by use of modern facilities and technology, and satisfies nearly all domestic demand. The other four manufacturers lack adequate production facilities and technology, and manufacture low-grade alumina refractories with chamotte as main raw materials, but do not satisfy customer requirements as to quantity and quality. Accordingly, most alumina refractories used in the Philippines are imported.
Raw materials suitable for the manufacture of alumina refractories are deposited in large quantities in the Philippines. These yet-unexploited deposits are available for use in the event an expansion of alumina refractories production is planned. Thus, if alumina refractories, using domestic raw materials as much as possible, can be domestically produced in the Philippines, it will be helpful for effective use of natural resources, and saving of foreign exchange by the reduction of imports, as well as possible net acquisition of foreign exchange by export of the

products, to contribute to the development of the economy of the Philippines.
The RCP desires to develop itself as a diversified refractories maker, on the foundation of the fundamental technology for refractories that the company already possesses. Thus, the present project has been planned as an expansion of RCP.

## 1.2 Market and Plant Capacity

### 1.2.1 Market

Alumina refractories are mainly used in steel and cement industries. Other users span a wide range of industry. The estimated demand for alumina refractories in 1990 and local production and import are shown hereunder. It is assumed here that there is no change in inventory.

| Demand | Local Production | Expected Import Volume |
|---|---|---|
| 21,057 t | 7,220 t | 13,837 t |

### 1.2.2 Sales Volume and Sales Revenue

In view of expected development of the existing local manufacturers as a result of the growth of user-industries, and the present need to meet demand for special products by imports, the following were taken into account to determine sales volume and sales revenue.

(1) The buyers of the product are to be the steel and cement industries that are already covered by the sales network of RCP.

(2) The sales territory is to primarily be Luzon, but users in Mindanao and Cebu are also to be supplied.

(3) Only high-grade products are to be produced and marketed.

(4) The quality of alumina refractories now being used by major customers has been used as the basis for determining new-product quality. The market share expected to be achieved is 40 to 70% of total demand (including that satisfied by both imports and domestic production), depending on the industry.

(5) Sales price was determined to the same as import price in consideration of the short time needed for delivery, availability of technical service, and intent to have product quality that is competitive with imports.

Based on the above, annual sales volume and sales revenue were determined as shown hereunder. The aggregate annual volume is equivalent to about 50% of present demand. This level will not endanger the existence of present alumina refractories makers.

| Product | Volume (t/y) | Unit Price (₱1,000) | Sales Revenue (₱1,000) |
|---|---|---|---|
| Alumina Refractories | | | |
| SK35 | 680 | 24.6 | 16,728 |
| SK36 | 800 | 27.8 | 22,240 |
| SK38 | 4,700 | 31.5 | 148,050 |
| SK39 | 1,000 | 34.9 | 34,900 |
| SK40 | 360 | 42.8 | 15,408 |
| Sub total | 7,540 | | 273,326 |
| Alumina Monolithics | | | |
| | 1,000 | 18.0 | 18,000 |
| Total | 8,540 | | 255,326 |

### 1.2.3 Plant Capacity

Plant capacity was determined on the basis of projected sales volume. The following were also taken into consideration.

(1) The conceptual (planning) design of the plant was prepared so as to enable doubling of capacity by expansion economically and cheaply in the future, in view of the

prospects for growth of domestic demand and the possibility of developing the export market.

(2) The plant was designed so as to utilize the existing facilities as much as possible, in order to minimize capital investment.

RCP possesses fundamental technology for the production of refractories, so that the operation of the new plant can quickly attain 100% of capacity. Thus, the following were determined.

First year : Operation at 80% of capacity
Second year on : Operation at 100% of capacity

## 1.3 Materials and Inputs

Among the refractory raw materials being mined in the Philippines at present, the following can be used for the raw materials for the projected plant.

| | | |
|---|---|---|
| Chamotte | : | 1,480 MT / year |
| Bonding clay | : | 850 MT / year |
| Rejected brick | : | 220 MT / year |

Among them,there is no problem for bonding clay and rejected clay. However, chamotte is obtained after sintering of raw clay. Thus, chamotte making line has to be separately installed. The minimum economic production scale unit is 6,000 to 10,000 MT a year although it depends on national situation. Accordingly, there is no merit for new installation of chamotte making line, so that imports of cheap chamotte from China have been planned for use for this project. Therefore, after ascertaining economical payability, it is better to plan domestic production of chamotte with making research and development for demand increase of domestic raw materials after start of operation of this project, in parallel with study for export of chamotte itself. By such efforts, it will be possible to utilize domestic raw materials up to nearly 50% of total requirements. Annual requirements of raw materials and utilities are shown hereunder.

| Item | Quantity | Unit | Supply Source | Total Cost (₱1,000) |
| --- | --- | --- | --- | --- |
| Raw materials | 2,800 | MT | Japan | 40,410 |
| " | 6,100 | MT | China | 35,630 |
| " | 1,070 | MT | Philippines | 850 |
| Sub Total | 9,970 | | | 76,890 |
| Inland Freight | | | | 1,780 |
| Import Duties (10%) | | | | 7,604 |
| Utilities | | | | |
| Electric Power | 2,150,000 | KWH | | 2,472 |

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| | | | |
|---|---|---|---|
| Fuel Oil | 990 | KL | 3,267 |
| Diesel Oil | 120 | KL | 564 |
| Other Oil | 13.2 | KL | 221 |
| Materials for Mould | 1 | lot | 2,850 |
| Total | | | 9,374 |

1.4 Location and Site

The project is an expansion project of RCP at the company's site in Iligan City, Mindanao, near the National Steel Corporation, the biggest user of alumina refractories in the Philippines. The new plant will be easily serviced by the same utilities now used for the existing plant.
Transport infrastructure and labor supply will present no difficulties. The site has easy access to a sea-port. Further, most of the land for the project lies within the premises of RCP, so that only 4,000 square meters of land is to be newly purchased.

1.5 Project Engineering

As an expansion project of RCP, the existing facilities, namely the maintenance work-shop, laboratory, and utilities supply systems can be utilized if only moderate extensions or additions are made. Therefore the initial capital investment will be very small in comparison with a new plant. In the selection of machinery and equipment, modern

facilities capable of manufacturing products with quality fully competitive with imports are to be used.
The production technology to be introduced is to be up-to-date. The project is to be carried out in an industry scarcely worried about pollution, but in due consideration of the problem, an international level of facilities was selected. For civil engineering work, the most economical design meeting specifications were prepared. Buildings do not have to take any mechanical load, so that a design calling for a cheap steel-frame structure with slate as the main building material was planned.

## 1.6 Plant Organization and Overhead Cost

The present organization of RCP can be advantageously used. The Alumina Refractories Production Department for the project is to be newly established but the other departments will be the existing ones to which a total of eight persons will be newly assigned.
For the marketing department, because users are almost identical to the present customers of RCP, the present sales network can be used as it is. New overhead cost is extremely low, but allocation to the new business line of a part of the burden of the existing organization is planned. The project will accomplish its objective at low cost on one hand, while RCP spreads fixed costs more widely on the other hand. Thus, the merit of the project is big.

## 1.7 Manpower

Production technics both for alumina refractories and basic refractories are fundamentally the same. Accordingly, by transferring some skilled operators from the existing plant to the project, an early start of operation of the project becomes possible. Manpower was planned as listed hereunder.

Manpower

| | |
|---|---|
| Production manager | 1 |
| Supervisor | 4 |
| Office assistant | 3 |
| Technical technician | 4 |
| Maintenance technician | 4 |
| Skilled worker | 24 |
| Unskilled worker | 14 |
| Total | 54 |

## 1.8 Implementation Scheduling

The most important problem to be resolved for implementation of the project is that of finance. It is especially a problem because the Philippines is harassed by a shortage of foreign exchange. On the assumption that this problem will be settled by the effort of the sponsor, the implementation scheduling was planned as stated hereunder.

| | | |
|---|---|---|
| Decision on implementation of the project | : | End of Sep. 1991 |
| Ordering of machine and materials | : | End of Dec. 1991 |
| Machine fabrication and installation work | : | End of Dec. 1992 |
| Start of operation | : | End of Jan. 1993 |

Final arrangements made for project finance

## 1.9 Financial Economic Analysis

### 1.9.1 Total Investment

The result of study for total investment and profitability of this project is shown hereunder. IRR is almost the same as the hurdle rate, 21%. EIRR, however, shows a high profit rate. Sales prices are determined in linkage with import prices. While having included import duties of 10% although they are 20% at present, the sales prices are highly realistic.

Unit ₱1,000

| Description | Foreign Currency | Local Currency | Total |
|---|---|---|---|
| Plant Construction Cost | 235,000 | 160,000 | 395,000 |
| Pre-operation Cost | 4,400 | 28,300 | 32,700 |
| Working Capital | 15,000 | 21,000 | 36,000 |

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| | | | |
|---|---|---|---|
| Total | 254,400 | 209,300 | 463,700 |

### 1.9.2 Project Financing

Project financing has been planned as per the below description.

| | |
|---|---|
| Equity | ₱121,700,000 |
| Long Term Loan | ₱342,000,000 |
| Total | ₱463,700,000 |

| | | |
|---|---|---|
| Interest | : | 21% per year |
| Grace Period | : | 2 years |
| Repayment | : | 6 years |

### 1.9.3 Tax Incentive

On the assumption that this project will be approved as a pioneer industry, the machinery and equipment to be imported for the project have been taken as free of import duties.

### 1.9.4 Production Cost

The production cost in full capacity of the plant is shown hereunder (3rd year).

| | |
|---|---|
| Raw materials | ₱86,274,000 |
| Utilities | 9,374,000 |
| Personnel | 2,859,000 |
| Spare parts | 2,401,000 |
| Maintenance | 1,120,000 |
| Technical | 5,107,000 |
| Factory overhead | 1,132,000 |
| Factory cost | ₱108,267,000 |
| Administration overhead | 1,692,000 |
| Sales & distribution | 6,832,000 |
| Operation cost | ₱116,641,000 |
| Interest | 71,820,000 |
| Depreciation | 37,268,000 |
| Production cost | ₱225,879,000 |

### 1.9.5 Financial Evaluation

a) IRR

| | | |
|---|---|---|
| IRROI before tax | : | 25.36% |
| IRROI after tax | : | 21.34% |
| IRROE after tax | : | 21.83% |

b) Profit rate

Unit ₱1,000

| Year | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Sales revenue | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 |
| Production cost | 207,178 | 225,879 | 215,349 | 207,208 | 195,238 |
| Gross profit | -2 917 | 29,447 | 39,977 | 48,118 | 60,088 |
| Income tax | ---- | 10,306 | 13,992 | 16,841 | 21,031 |
| Net profit | -2,917 | 19,141 | 25,985 | 31,277 | 39,057 |
| Divident | ---- | ----- | 12,170 | 18,255 | 24,340 |
| G.P.R. (Sales)% | -1 | 12 | 16 | 19 | 24 |
| N.P.R. (Sales)% | -1 | 7 | 10 | 12 | 15 |
| N.P.R. (Equity)% | -2 | 16 | 21 | 26 | 32 |
| Break-even point % | 82.0 | 79.7 | 72.2 | 65.6 | 57.1 |

c) Pay-back period

Pay-back period : 5.0 years

d) Sensitivity analysis

Calculation of profitability in response to variation of sales price, investment and operation cost is as follows.

Variation of sales price

The products to be manufactured are now imported. The import duty of 20% is levied on imports at present, but it is supposed that the duties will be decreased to 10% in the near future. Therefore, the sales prices have been determined to be the same as import prices inclusive of import duty of 10%. In the future, it is considered that import duties may be repealed. So, a variation of -10% is assumed. Meanwhile, since the present 20% duty may be continued, variation of +10% is also assumed.

| Variation ratio (%) | -10 | 0 | +10 |
|---|---|---|---|
| IRROI after tax | 16.68 | 21.34 | 25.48 |
| IRROE after tax | 11.28 | 21.83 | 32.52 |

Variation of investment cost

In due consideration of price variation in the future, sensitivity analysis of ± 10% has been conducted.

| Variation ratio (%) | -10 | 0 | +10 |
|---|---|---|---|
| IRROI after tax | 23.86 | 21.34 | 19.08 |
| IRROE after tax | 25.42 | 21.83 | 18.63 |

Variation of operating cost

In due consideration of future price variation, sensitivity analysis of ± 10% has been conducted.

| Variation ratio (%) | -10 | 0 | +10 |
|---|---|---|---|
| IRRCI after tax | 23.32 | 21.34 | 19.19 |
| IRROE after tax | 26.81 | 21.83 | 16.77 |

1.9.6 Reduction of bank interest rate

The present rate of bank interest in the Philippines is so high. For the purpose of increasing the profitability of this project under such circumstances, the countermeasure stated here-under is considered.

(1) Reduction of bank interest rate

In case that 80% of foreign exchange portion of Import Machinery and Equipment is covered by supplier's credit of low interest rate 12% per year, IRR results in the following to increase profitability.

| | Original Plan | Revised Plan |
|---|---|---|
| IRROI Before Tax | 25.36% | 25.36% |
| IRROI After Tax | 21.34% | 21.34% |
| IRROE After Tax | 21.83% | 26.90% |

(2) Inflation

The present high rate of bank interest is abnormal. The calculation of IRR in consideration of inflation factor results in the following to increase IRROE largely.

| | Original Plan | Revised Plan |
|---|---|---|
| IRROI Before Tax | 25.36% | 35.36% |
| IRROI After Tax | 21 34% | 29.53% |
| IRROE After Tax | 21.83% | 40.84% |

(3) Equity ratio

In generally speaking, under the circumstances of high rate of bank interest, the higher the equity ratio is, the more the profitability increases. In the project plan, however, IRROI after tax is 21.34% and IRROE after tax is 21.83%, which exceeds bank interest rate slightly. Thus, such way can not be said to be greatly effective.

## 1.10 National Economic Evaluation

The project greatly contributes to national economy of the Philippines as stated hereunder.

### 1.10.1 Saving of foreign exchange

This project aims at preventing foreign exchanges from outflow for the time being by domestic production of the products relying upon imports at present. To implement this project, foreign exchanges of ₱254,400,000 (approximately US$11.158,000) are needed. The foreign exchanges can be completely repaid without coming up short by the eighth year after the start of the construction and the saving of foreign exchanges of ₱34,643,000 (approximately US$1,519,000) separately becomes possible until that time. After the completion of repayment of the foreign currency loan, it becomes possible to save US$5,000,000 every year. Therefore, the possibility of saving foreign exchanges by export of such products in future can be said to be high.

### 1.10.2 Promotion of employment

Iligan was planned as an industrial area and is now being developed. Unemployed manpower is still rich in the area. If this project is implemented, it needs much manpower in the construction works. In the start of operation of this project, workers are to be employed. In indirect effect, the transportation of materials, raw materials and products leads to the development of transportation industry to contribute the development of local area.

### 1.10.3 Export potential

Detailed study of the possibility of exporting product, whereby this project could cause a net inflow of foreign exchange, has not been within the scope of this study. It is believed, however, that export potential does exist, based on the resources endowment of the Philippines. Few South-East Asian countries are producing high grade alumina refractories as planned in this project. This factor suggests that the proposed expansion can be a valuable step toward increasing exports and improving the balance of payments on the trade account.

## 1.11 Conclusion

### 1.11.1 Major advantages of this project

This project can be said to be feasible and has merits as stated hereunder.

(1) Domestic production of alumina refractories, a product now being imported, will greatly save foreign exchange.

(2) Investment in facilities is modest because an existing plant is being expanded. Further, an early start of operation can be accomplished since fundamental technology on refractories is already possessed.

(3) The usage ratio of domestic raw materials is approximately 10% during the initial period of operation. The project will, however, stimulate development of domestic resource endowments and the ratio can be gradually raised to nearly 50%. In comparison with the usage ratio of domestic raw materials of 30% in Japan, the project is advantageous.

(4) The project is helpful for exploitation and utilization of natural resources and promotion of employment.

### 1.11.2 Implementation of the project

Demand and essential preconditions for successful implementation of the project already exist, and therefore the project should be implemented soon. The promotor of this project and RCP itself fundamentally agree to make investment to this project. The problem to be faced at this point is that the present economic situation of the Philippines tends toward inflation and poorer financial conditions. Especially, bank loan interest is so high that there is a fear that willingness of industrialists and entrepreneurs to make investments could be reduced.

It is therefore desirable that a partner capable of issuing supplier's credit be identified. Moreover, if a concessional loan from a foreign country can be obtained, the prospects of the project will be greatly enhanced.

# II. PROJECT BACKGROUND AND HISTORY

## 2.1 General

The Alumina Refractories Manufacturing Project was planned as an expansion project of Refractories Corporation of the Philippines ("RCP"), a company engaged in the manufacture and sales of basic refractories in the Philippines. High-grade alumina refractories are now imported by the Philippines. If they could be domestically produced, it will exert a favorable influence on the national economy. To achieve domestic production of high grade alumina refractories, it would be extremely advantageous in terms of reducing both investment cost and production cost if RCP is to be the maker.

## 2.2 Project Background

### 2.2.1 Demand for refractories

Refractories are indispensable fundamental materials for industries that use high temperatures in the production process. For example, in the manufacture of steel products and cement products, refractories are indispensable.
Refractories can be broadly divided into basic and alumina types. High-grade basic refractories are now being manufactured and sold by RCP from whom almost

the entire demand in the Philippines can be supplied. Alumina refractories are being produced by several manufacturers, but their production facilities and production technology are insufficient and the products therefrom are almost entirely low-grade, so that neither production quantity nor product quality can meet the requirements of customers. Accordingly, the greater part of the alumina refractories used in the Philippines including almost all high-grade ones must be imported.

### 2.2.2 Production of Alumina Refractories

The raw materials needed for production of refractories are deposited in large quantities in the Philippines. Little of these resources have been exploited. If they are used, however, it will contribute to the development of various industries, and if they can substitute for imports, it will help improve the trade balance.
Meanwhile, since its establishment in 1977, RCP has been engaged in the manufacture and sale of basic refractories. During those years, fundamental technology for refractories has been accumulated and the sales network has been built up. Consequently, RCP is equipped with basic ability to manufacture and market alumina refractories.

### 2.2.3 Method of Basic Promotion of the Project

RCP is conveniently located, with respect to both proximity to main customers and to sources of raw materials, utilities, labor, etc. Accordingly, the premises of RCP's existing plant shall be the plant site of the project.

RCP possesses some land not being used and is well furnished with such support facilities as an administration office, laboratory, maintenance workshop, staff house, canteen, etc. The project is to make full use of them and will require only a moderate supplementary effort, by acquisition of adjacent land. Human resources would be available from the existing plant, where they can be easily replaced.

Raw materials comprise those for use in crude condition and those for use after firing of green body to make briquettes. (The latter is called chamotte.) As a result of the survey of domestic raw materials, it was found that there are available much raw materials suited to chamotte making. For the time being, however, the quantity of chamotte to be required for the project is not so much as to justify commercial production. Accordingly, chamotte production facilities are not planned as part of this project, and Chinese-made low-cost chamotte is planned to be imported. The construction of chamotte production facilities can be planned at that future time when it is desirable.

In consideration that presently existing local manufacturers of high alumina refractories can be expect makeed to further progress and develop, the projected market share of the products has been moderated.

### 2.2.4 External Effects of Implementation of the Project

(1) Saving and procurement of foreign exchange
The value of imports in 1990 of high-grade alumina refractories is estimated to be US$8,000,000. Import of alumina refractories for 1988 to date average 11,846 MT a year. The planned production and sales quantities occupy 63.7% as against the figures which include low-costed and less value-added products. All of the high-grade products being imported mainly from Japan have been planned to be replaced by products from the proposed plant.

(2) Development of the region and creation of jobs
Iligan city in Mindanao, to be the site of the project, is in an industrial district, where various industries are being developed. However, further development is needed for the creation of jobs, elevation of income, and promotion of regional economic development through other means. The proposed expansion will create only a few jobs directly, but will also improve employment prospects through the increase in raw materials purchasing, shipment of finished products, etc.

(3) Exploitation of raw materials
The Philippines has large quantities of raw materials for refractories, some of which are in the Mindanao district itself. The Philippines has large quantities of raw materials for refractories, some of which are in the Mindanao district itself. A part of the raw materials

is used from initial stage for this project. For chamotte usable only after sintering of raw materials, separately new installation of chamotte making line is necessary. For the time being, however, there is no merit for new installation of chamotte making line. Through investigation and exploi-tation of high quality raw materials, as well as research and development of possible extension for use of domestic raw materials after start of operation of this project, if the use of domestic raw materials is promoted, it will exert a favorable effect upon national economy.

## 2.3 Project Promoter

### 2.3.1 Outline of RCP

(1) Establishment: 1977

(2) Location

Head office: 2286 Ground Flr. Alsons Bldg. Pasong Tamo
Extension Makati, Metro Manila

Iligan plant: Bo. Mapalad, Iligan City, Lanao del Norte

(3) Start of operation: 1980

(4) Products: Basic refractories

(5) Capital and Main shareholders:

Capital: ₱80,000,000

Main shareholders :

| | |
|---|---|
| National Steel Corporation | 71.12% |
| National Development & Investment Corporation | 17.54% |
| Alsons Development Corporation | 5.90% |
| Tomen Corporation(Japan) | 2.72% |
| Mino Yogyo Co., Ltd. (Japan) | 2.72% |
| Total | 100.00% |

(6) Business Results

| | 1988 | 1989 |
|---|---|---|
| Net Sales | ₱183,220,529 | ₱175,370,128 |
| Net Income | ₱12,746,507 | ₱6,664,540 |

2.3.2 Implementation of the project

RCP is now 88.66% owned by domestic Philippine interests. In the Philippines at present, national policy favors privatization of national enterprise. Because the two major shareholders are national corporations, it is expected that RCP will be privatized before long. In such an event, Alsons Development & Investment Corporation and the two Japanese investors agree to acquire majority shares. To finance the project, RCP has the intention to increase its own capital and takeout loans from commercial banks.

## 2.4 Project History and Feasibility Study

2.4.1 With the objective of becoming an integrated refractories manufacturer, RCP began to plan a alumina refractories manufacturing plant several years ago. The following studies were made but an appropriate plan could not be worked out so far.

(1) Survey on raw material deposits in the Philippines

(2) Market survey in the Philippines for alumina refrac tories demanded in the steel and cement industries.

2.4.2 Alumina refractories are fundamental materials indispensable for the steel and cement industries. With the recent development of economy in the Philippines, the demand for alumina refractories has expanded so as to increase import volume, causing outflow of foreign exchange. The United Nations Industrial Development Organization therefore decided to carry out a feasibility study for the project and dispatched a consultant's survey team to the Philippines. After carrying out the field survey in the Philippines and analyzing data collected therefrom, the survey team made this feasibility study report.

# III. MARKET AND PLANT CAPACITY

## 3.1 General

Refractories are used in all industries requiring high temperature. The main demand for alumina refractories to be an object of present survey is in the steel and cement industries. In the specific case of the Philippines, glass industry and foundry are added thereto. To determine total demand quantity in the Philippines is so difficult that the methodology stated below was adopted.

3.1.1 Records of consumption of refractories at the main users were studied. Based on this, unit consumption quantity of products by enterprises was sought and the consumption quantity of refractories by all enterprises was calculated.

3.1.2 The demand quantity of alumina refractories was calculated based on import records.

3.1.3 The marketable quantity to be determined for this study was calculated by deducting the surveyed production quantity of existing manufacturers of alumina refractories, from the estimated total demand quantity.

## 3.2 Demand Analysis

### 3.2.1. Description and Uses of the Products

(1) Alumina Refractories

(1)-1 Fireclay Bricks

A fireclay refractory is manufactured mainly from mineral aggregates, essentially hydrous silicates of aluminum. Refractory bricks below SK34 are called fireclay bricks.
The principal component is kaolinite. Fireclay bricks are also sometimes called chamotte bricks because they use pre-fired raw materials in order to avoid excessive shrinkage and cracking during firing.

Fireclay bricks are typically applied in the following areas:

Casting Pits
Rotary Kilns - Discharge End or Cooling Zone, Preheater, Preheating Zone, Calcining Zone
Boilers
Crucible Furnaces
Refining Furnaces
Cupolas
Heating Furnaces

(1)-2 High-Alumina Bricks

A high-alumina brick contains 45% to 99.5% alumina. The main chemical components are $Al_2O_3$ and $SiO_2$. High-alumina bricks have a Pyrometric Cone Equivalent (PCE) of SK35 to 42. This type of brick has high refractoriness (or PCE) proportional to alumina content, high resistance to various kinds of slag, high mechanical strength, and higher thermal conductivity than fireclay brick, and increase in conductivity in direct proportion to the content of $Al_2O_3$.

The typical applications of high alumina bricks are:

- Calcining, Transition, Cooling or Discharge End, Hood and Cooler of Cement Rotary Kiln
- Boilers
- Regenerator Walls of Glass Melting Furnaces, Checkers and Crowns
- Electric Arc Furnace Roofs
- Ladles
- Ceramic Kilns and Furnaces

(1)-3 Monolithic Refractories

These are granular furnace lining materials with no joints, formed by ramming, casting, or sintering into place.

Mortar - A mortar is any finely ground refractory mixture. Its main application is to fill masonry joints and to remedy small shell deformations.

Castables - A castable is a hydraulic setting refractory, suitable for casting into heat-resisting shapes or walls. it is classified into insulating, high-temperature, middle-temperature and dense. Some typical applications are:

- Burner Blocks
- Pertoleum Refinery Equipment
- Walls of Boilers Settings
- Bottoms and Ladles for Steel Smelting Furnace
- Rotary Kiln's Chain Section
- Bottoms and Ladles for Steel Melting Furnace
- Cupolas

Plastic Refractory - A plastic refractory is one tempered with water, and of workability which permits it to be pounded into place to form a furnace lining or special shapes. Some typical applications are:

- Roof and Walls for High-Temperature Furnaces
- Boiler Settings
- Cupolas
- Ladles
- Soaking pits

Forging and Annealing Furnaces

Ramming, Gunning Mixes - A mixture of refractory aggregates materials, be it wet or dry mixes but differing in the method and areas where commonly used as patching and stamping materials. Some typical applications are:

Lining for Cast Iron and Non-Ferrous Metal Melting Furnaces
Ladle Linings for High Manganese Steel
Induction Metal Melting Furnaces for Cast Iron and Steel
Cupolas

### 3.2.2. Consumer Industries

#### (1) Alumina-Refractories User Industries

Alumina refractories are consumed by industries whose operations require the use of high temperature. Alumina refractories insulate the linings of the major equipment used by these industries.

The main users of alumina bricks are the steel, cement, glass and foundry industries. The steel industry holds the biggest share of the total requirements at 40%, followed by the cement industry with 15%. Other key consumers are the foundry, ferro-alloy, sugar, wood processing, copper smelter, ceramic, coconut oil mill, and petroleum industries.

Refractories are essential to these industries. The quality of refractories will directly affect the continuity of their operations. While the cost of refractories per se is only a small percentage of these industries' total cost, the losses incurred when there is an operation stoppage to refractory failures are very high.

(2) Performance and Prospects of The Top Three Industry Users

Refractories are vital inputs for operations in the cement, steel and glass industries. To evaluate future needs in alumina refractory products, an evaluation may be made of the growth of these industries.

(2)-1 Steel Industry

Industrial subsectors that are heavy users of steel products are expected to grow at or faster than the level achieved in recent years. This scenario is indicative of bright market prospects for the steel industry.

The state-owned National Steel Corporation (NSC), in anticipation of the bright market prospects for the coming years, is embarking on an expansion program. NSC, the country's premier steel-producing establishment, is by far the largest of some sixty major firms producing basic iron and steel products.

The expansion program of NSC is deemed necessary to enable the steel firm to meet the increasing demand for steel products. In 1986, NSC's total production, the highest on record, reached 712,000 MT, but it was short of total demand, which was 826,000 MT. The gap was filled by imports of basic metals (iron and steel). Philippine iron and steel imports in 1986 totaled 677,000 MT evaluated at $204 million. Domestic demand for steel products as projected by NSC will continue to rise to as much as 1.55 million MT by 1991.

In line with the expansion program of NSC, new plants are to be commissioned to increase NSC's production from 1.1 million MT of hot rolled coils and sheets to 1.7 million MT; from 700,000 MT. of cold rolled coils to 1.5 MT; from 250,000 MT of tinplates to 400,000 MT and from 300,000 MT of billets to 450,000 MT.

With the commissioning of new plants, the steel firm's alumina refractory consumption will increase causing a sharp rise in demand for refractories.

## (2)-2 Cement Industry

Cement enjoyed a surge in demand since the country's economic turnaround began in 1986, and is expected to further expand its sales in the next five years in the face of a construction boom. The construction upswing was triggered by the government's massive infrastructure program and the renewed interest of local and foreign investors in the country.

Total cement sales or the sum of domestic and export sales, rose by 22.7% to 135 million 40-kg bags in 1988 from 110 million bags in the previous year. The average rate of growth of cement sales from 1986 to 1988 was 29.5%. Domestic sales grew at the average rate of 31.7% over the last three years. Meanwhile, exports declined by 61.5% in 1987 and altogether stopped in 1988 due to the strong domestic market. Cement manufacturers have to cater first to the needs of local end-users.
At present, a temporary export ban on cement is in effect, as there is a shortage in the domestic market. Philcemcor projects demand for cement to reach 150.8 million bags in 1989 and grow to 188.3 million bags in 1992. The Department of Trade and Industry, on the other hand, projects a 15% annual increase in demand for cement between 1990 and 1993. This surge in demand could result in an acute shortage and force government to import again.

Historically cement production grew at the average rate of 27.3% during the last three years. During the first four months of 1989, cement production surged by 96.8% to 52.4 million 40-kg bags from its level a year earlier.
Business expansion in recent months accelerated the number of construction projects and necessitated a tremendous increase in production.
The supply of cement in 1989 is expected to reach only 145.8 million bags which means a shortage of 5.0 million bags for the year.

Cement production in the Philippines has remained relatively low despite there being a considerable number of plants operating throughout the country. One of the main reasons for this is the delayed rehabilitation program.
Most of the cement manufacturing plants are 20 - 30 years old and are ill-equipped to cope with projected demand. If these plants are unable to expand production, a shortage of 42.5 million bags in 1992 may occur.

To prevent this problem, the Cement Industry Rehabilitation and Modernization Program was launched in October 1988. The program aims to assist manufacturers in producing cement locally in adequate quantity at reasonable cost and to make this product competitive in the export market in the long run.
In addition, the program provides incentives to any

existing cement plant proposing to engage in a rehabilitation project that will increase output or improve energy efficiency by at least 20%. The program calls for the maintenance and repair of existing plants, acquisition of new machinery and equipment, conversion to coal-firing systems or other energy-efficient systems, and acquisition and installation of power generating equipment. It is expected to boost output by 3.3 million MT per year beginning 1991, equal to 75 million bags a year or 43% of the industry's present capacity of 176 million bags a year. Benefits from this program are expected to be fully realized by 1992.

As of now 14 cement plants have already had their expansion plans approved by the Department of Trade and Industry, and would put an additional 15 million tons annual capacity into the market over the next two years.

However, the increase in the capacity of the industry is still considered insufficient to cover the projected gap between demand and supply. To alleviate the lack of cement supply in the country, 600,000 MT of cement will be imported from Indonesia, 400,000 MT from Iran, and 1.5 million bags from China. Aside from these shipments, big end-users also received shipments of a total of 40,000 MT of cement, and 15,000 MT of clinker from Dec. 24 to end of January 1990.

Cement manufacturing is a preferred area in the 1989 Investment Priorities Plan (IPP) of the BOI. Based on the assumption that the 14 cement firms complete their programs by 1991, there will still be a production shortfall. A new cement plan with a production capacity of one million tons per year will be additionally required to help industry meet demand.
Efforts are being made to address this problem.

This scenario indicates that as the rehabilitation and modernization programs of cement plants get underway as supply is increased, the refractory manufacturers could expect favorable market prospects.
The rehabilitation and modernization of cement plants would, require the additional input of great quantities of refractory materials, either basic of alumina. Hence, this would serve as another factor contributing to the bouyancy of the market for refractories in the future.

(2)-3 Glass Industry

The general economic recovery which began in 1987 continues to the present, with the construction sector providing a major boost to the recovery process. While the growth in 1987 and 1988 was consumer-led, more investments in 1989 and succeeding years are needed to expand capacity and thus sustain economic take-off. Such investments, both domestic and foreign, have started to flow into the economy.

The glass container sector benefited from the tremendous surge in consumer spending in the past few years. From a low-capacity-utilization situation (50 % of rated capacity in 1985 and 1986, 70% in 1987), it suddenly found itself unable to cope with the demand (close to 100% in 1988). The tightness in supply forced some users to import, primarily from Taiwan. Idle capacity has now been activated but over the near term it will still be a seller's market.

Domestic consumption of flat glass is represented by the domestic sales of the lone manufacturer, Republic Glass Corporation (RGC), and by imports. Consumption grew by 65% in 1987. Sales by RGC increased by 55% and accounted for 86% of total consumption in that year. Exports similarly grew substantially, by 66%, because of the determined efforts of RGC. To meet the added demand, RGC reopened a sheet glass furnace which had been closed down during the economic crisis, bringing to three the total number of furnaces in operation.

To maintain its dominant position in the domestic market and enable it to compete more aggressively in the export market, RGC is now in the process of establishing a 400 MT flat glass plant in joint venture with Asahi Glass. The project has been registered as a pioneer activity with the Board of

Investments and is scheduled to be operational before the end of 1991.

### 3.2.3. Methodology

To estimate annual alumina refractories demand, the following method was applied:

From the biggest users of alumina refractories the consultant obtained their refractory requirements.

For those industries for which it was not possible to obtain information from all users, either because of the presence of many small firms in a particular industry or because of the reluctance of the owners to give out information, the consultant took a representative sample of firms from each industry and from that derived a unit consumption figure.

For instance, there are 19 cement plants operating in the country. The consultant contacted 10 out of the 19 plants and from their requirements the Consultant derived a unit consumption of 0.462 kg of alumina refractories per metric ton of clinker output. This unit consumption was then applied to the rest of the cement plants to arrive at the total alumina refractory requirements of the cement industry.

SCHEDULE 3-1

| Cement Plants | Production Capacity (MT Clinker) | Actual Annual Consumption (MT) | Unit Consumption Kg/T Clinker |
|---|---|---|---|
| Mindanao | 135,936 | 57.50 | 0.423 |
| Fortune | 326,245 | 102.70 | 0.315 |
| Iligan | 420,824 | 121.00 | 0.288 |
| Floro | 453,119 | 130.00 | 0.287 |
| Northern | 679,678 | 161.00 | 0.237 |
| Apocemco | 200,755 | 75.49 | 0.304 |
| Bacnotan | 243,570 | 290.00 | 1.187 |
| Solid | 566,321 | 291.83 | 0.515 |
| FR | 543,742 | 314.00 | 0.577 |
| Rizal | 426,853 | 175.50 | 0.411 |
| Total/Average | 3,997,043 | 1,719.02 | 0.462 |

Source : Interviews and available statistical data

| | |
|---|---|
| Total production capacity of remaining nine plants | 3,151,867 |
| Estimated consumption of remaining plants | 1,456.16 |
| Actual consumption of surveyed plants | 1,703.47 |
| Total consumption of cement industry | 3,159.63 |

### 3.2.4 Annual Alumina Refractory Consumption

(1) Consumption, by Product Type

The annual alumina refractory consumption of selected major industries is 21,057 MT. The annual consumption figure broken down as per product type is as follows:

SCHEDULE 3-2

| Product | Volume | % to Total |
|---|---|---|
| Firebricks | 4,528 MT | 21 % |
| Hi-Alumina | 13,599 MT | 65 % |
| Monolithics | 2,930 MT | 14 % |
| | 21,057 MT | 100 % |

(2) Consumption, by SK Rating

Annual consumption as to SK or Seger Cone rating is derived below:

SCHEDULE 3-3

| Product | SK Rating | Volume | % to Total |
|---|---|---|---|
| Firebricks | 28 | 25 MT | 0.5 % |
| | 30 | 302 | 6.7 |
| | 31 | 180 | 4.0 |
| | 32 | 1,728 | 38.1 |
| | 33 | 249 | 5.5 |
| | 34 | 2,044 | 45.2 |
| | | 4,528 MT | 100.0 % |
| High-Alumina | 35 | 1,071 MT | 7.9 % |
| | 36 | 1,828 | 13.4 |
| | 37 | 264 | 2.0 |
| | 38 | 6,528 | 48.0 |
| | 39 | 1,633 | 12.0 |
| | 40 | 2,091 | 15.3 |
| | 41 | 122 | 0.9 |
| | 42 | 62 | 0.5 |
| | | 13,599 MT | 100.0 % |

Eighty-three per cent of the total consumption for firebricks consist of bricks with Sk ratings of 32 and 34. This type of firebrick is mostly used in the steel, cement, glass, and foundry industry as well as industries which make use of boilers.

In the high-alumina division, the most sought-after bricks are those with SK ratings of 38 to 40. This type of brick are widely used by the steel and the cement industry.

(3) Consumption, by Industry

The survey conducted of the foregoing key industry users reveals the following annual alumina refractory requirements:

SCHEDULE 3-4

| Industry | Volume | % to Total |
|---|---|---|
| Steel | 8,478.01 MT | 40.26 % |
| Cement | 3,159.63 | 15.00 |
| Glass | 2,007.53 | 9.53 |
| Foundry | 1,967.01 | 9.34 |
| Other Boiler Users | 1,034.12 | 4.91 |
| Ferro-Alloy | 995.57 | 4.73 |
| Sugar | 811.82 | 3.86 |
| Wood Processing | 741.66 | 3.52 |
| Rerollers | 469.55 | 2.23 |
| Lime | 426.70 | 2.03 |
| Copper Smelter | 357.50 | 1.70 |
| Coconut Oil Mills | 320.19 | 1.52 |

- Continued to next page -

| | | |
|---|---|---|
| Galvanizers | 109.50 MT | 0.52 % |
| Ceramic | 107.60 | 0.51 |
| Petroleum | 71.07 | 0.34 |
| | 21,057.46 MT | 100.00 % |

(3)-1 Steel Industry

a) Steel Materials

There are twelve steel mills in the country, all of which are located in Luzon except for that of the National Steel Corporation which is in Mindanao.

The steel industry has a total annual rated capacity of 768,000 MT, of which the goverment-owned National Steel Corp. has the largest rated capacity, 350,000 MT per annum. The following table on the next page shows the annual rated capacity of each steel plant.

SCHEDULE 3-5

| Melters | Rated Capacity MT/Y |
|---|---|
| National Steel Corp. | 350,000 |
| SKK Corporation | 72,000 |
| Armco-Marsteel Alloy Corp. | 60,000 |
| Milwaukee Industries | 60,000 |
| Metro Concast Corp. | 50,000 |
| Phil. Nails & Wire Corp. | 50,000 |
| Apollo Steel Corp. | 45,000 |
| Armstrong | 30,000 |
| Cathay Pacific | 24,000 |
| Osaka Steel | 10,800 |
| Master Steel | 9,000 |
| Union Steel | 7,200 |
| | 768,000 |

Alumina Refractory Requirements - The steel industry has an annual alumina refractory requirement of 8478 MT.
Of the total steel industry requirement, NSC requires the biggest volume of refractories, 3,516.50 MT or 41% of the total.
These figures were obtained in interviews while those of the other steel plants were derived using a unit consumption of 0.01 MT of alumina refractories per MT of steel production. (For details, please refer to Table AN-1-1.)

The table below exhibits the steel industry's alumina refractory requirements disaggregated by type and SK rating.

SCHEDULE 3-6

| SK Rating | Volume (MT) | % to Total |
|---|---|---|
| **Bricks** | | |
| Firebricks | | |
| SK 28 | 4.43 MT | 2.00 % |
| SK 30 | 38.03 | 16.00 |
| SK 33 | 68.63 | 30.00 |
| SK 34 | 119.55 | 52.00 |
| | 230.64 MT | 100.00 % |
| High-Alumina | | |
| SK 36 | 16.83 MT | 0.23 % |
| SK 38 | 4,723.16 | 65.40 |
| SK 39 | 1,379.53 | 19.10 |
| SK 40 | 1,000.88 | 13.86 |
| SK 41 | 101.86 | 1.41 |
| | 7,222.26 MT | 100.00 % |

Monolithics

| | | |
|---|---|---|
| SK 34 | 115.12 | 11.22 |
| SK 36 | 6.60 | 0.53 |
| SK 38 | 675.25 | 65.85 |
| SK 40 | 92.99 | 9.10 |
| Unknown | 136.16 | 13.30 |
| | 1,026.12 MT | 100.00 % |

Overall Breakdown

| | | |
|---|---|---|
| Firebricks | 230.64 | 2.80 |
| High-Alumina | 7,222.25 | 85.20 |
| Monolithics | 1,025.12 | 12.00 |
| | 8,478.01 MT | 100.00 % |

b) Rerollers

Rerollers are firms engaged in the processing of intermediate products such as blooms, or billets into non-flat steel products. The industry is composed of sectors based on the shape of steel they produce, namely bars, wire rods, and shapes and sections. There are 25 operating steel bar makers. The total production capability of all these plants is 516,000 MT per year.

In the wire rod sector, there are 8 identified producers. The sector's total production capability is 271,600 tonnes per year.

There are six plants identified as engaging in the production of steel in shapes and sections. Total production capability of these rerollers is 151,400 tonnes.

Based on the annual requirements as ascertained at some of the rerollers, a unit consumption of 0.0005 per MT of production capacity was obtained and was used to estimate consumption of the whole industry. (Please refer to Table AN-1-2 for details.)

The reroller industry has an annual alumina refractory requirement of 469.55 MT, as follows:

SCHEDULE 3-7

| SK Rating | Volume | % to Total |
|---|---|---|
| Bricks | | |
| Firebricks | | |
| SK 32 | 37.95 MT | 15.00 % |
| SK 34 | 209.58 MT | 85.00 % |
| | 247.53 MT | 100.00 % |
| High-Alumina | | |
| SK 36 | 214.57 MT | 100.00 % |
| Monolithics | | |
| Castables | 7.45 MT | 100.00 % |

Overall Breakdown

| | | |
|---|---|---|
| Firebricks | 247.53 MT | 52.71 % |
| High-Alumina | 214.57 MT | 45.70 % |
| Castables | 7.45 MT | 1.59 % |
| | 469.55 MT | 100.00 % |

c) Galvanizers

The galvanized iron sheet industry, another subsector of the steel industry, is primarily engaged in the manufacture of galvanized iron sheets which are either plain or color coated (bonded), and flat or corrugated. Sheets are made from billets which underwent further processing for conversion into cold-rolled products. Cold-rolled coils and sheets, the primary raw materials utilized in the manufacture of sheets, are galvanized, usually using the hot-dip process of zinc coating.

The galvanized steel sheet producers in the Philippines are represented by the Filipino Galvanizers Institute, Inc. At present, there are eleven firms in the industry, the biggest being Puyat Steel Corp., and Philippine Steel Coating Corporation. The industry's total production capacity is 438,000 MT per year. With the production of 220,400 MT in 1987, the plant utilization in that year was 51%.

The industry has an annual alumina refractory requirement of 109.5 MT. The consultant's survey of the galvanizers shows an average unit consumption of 0.0003 per metric ton of output. Table AN-1-3 gives details.

SCHEDULE 3-8

Galvanized Iron Sheet Industry,
by as per Type & SK Rating

| SK Rating | Volume MT | % to Total |
|---|---|---|
| Bricks | | |
| Firebricks | | |
| SK 32 | 13.50 MT | 48.70 % |
| SK 34 | 14.25 MT | 51.30 % |
| | 27.75 MT | 100.00 % |
| High-Alumina | | |
| SK 36 | 67.04 MT | 100.00 % |
| Monolithics | | |

| | | |
|---|---|---|
| Castables | 15.21 MT | 100.00 % |

Overall Breakdown :

| | | |
|---|---|---|
| Firebricks | 27.25 MT | 24.90 % |
| Hi-Alumina | 67.04 MT | 61.20 % |
| Castables | 15.21 MT | 13.90 % |
| | 109.50 MT | 100.00 % |

(3)-1 Cement Industry

Nineteen cement plants are covered by this study, including Prime White Cement which is the sole manufacturer of white cement.

As of 1988, the industry has a combined production capacity of 7,148,910 tonnes of clinker per year.

The cement industry has an annual alumina refractory requirements of 3159.63 MT. The survey conducted of the cement plants indicates an average unit consumption of 0.462 kg per MT of clinker.
Table AN-1-4 exhibits this in detail.

The table below presents the cement industry's requirements.

SCHEDULE 3-9

Cement Industry
Requirements, by Type & SK Rating

| SK Rating | Volume | % to Total |
|---|---|---|
| **Bricks** | | |
| Firebricks | | |
| SK 28 | 20.40 MT | 6.56 % |
| SK 30 | 66.66 MT | 21.44 % |
| SK 31 | 18.55 MT | 5.97 % |
| SK 32 | 88.16 MT | 28.36 % |
| SK 33 | 18.55 MT | 5.97 % |
| SK 34 | 98.57 MT | 31.70 % |
| | 310.89 MT | 100.00 % |
| **High-Alumina** | | |
| SK 35 | 389.14 MT | 16.90 % |
| SK 36 | 504.38 MT | 21.90 % |
| SK 37 | 93.67 MT | 4.10 % |

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| | | |
|---|---|---|
| SK 38 | 1,215.65 MT | 52.80 % |
| SK 39 | 44.52 MT | 1.90 % |
| SK 40 | 12.98 MT | 0.60 % |
| SK 42 | 40.81 MT | 1.80 % |
| | 2,301.15 MT | 100.00 % |

Monolithics

| | | |
|---|---|---|
| Castables | 475.28 MT | 86.80 % |
| Mortar | 72.32 MT | 13.20 % |
| | 547.60 MT | 100.00 % |

Overall Breakdown

| | | |
|---|---|---|
| Firebricks | 310.89 MT | 9.84 % |
| High-Alumina | 2,301.15 MT | 72.83 % |
| Monolithics | 547.60 MT | 17.33 % |
| | 3,159.64 MT | 100.00 % |

(3)-3 Glass Industry

The country has only six glass container manufacturers, namely San Miguel Corp., Union Glass and Container Corp., Union Industries, Asia Brewery Inc., Pacific Enamel and Visayan Glass.
The total annual rated capacity of the glass container

industry is 567,930 MT. At present, glass container and bottling companies are already operating at full capacity.

The flat glass sector of the industry is solely occupied by Republic Glass Corporation. At present RGC has three furnaces in operation.
RGC is also in the process of establishing a 400 MT float glass plant.

Based on the consultant's study of SMC, Union Glass and RGC refractory requirements, and using the estimated unit consumption of 0.002 MT of alumina refractories per metric ton of output for the other glass plants, the industry's estimated annual consumption amounts to 2007.53 MT. (Please refer to Table AN-1-5). The table below gives a breakdown of the glass industry's total consumption.

SCHEDULE 3-10

Glass Industry

Requirement, by Type & SK Rating

| SK Rating | Volume MT | % to Total |
|---|---|---|
| **Bricks** | | |
| Firebricks | | |
| SK 31 | 161.33 MT | 13.38 % |
| SK 32 | 504.01 MT | 41.82 % |
| SK 33 | 161.33 MT | 13.39 % |
| SK 34 | 378.55 MT | 31.41 % |
| | 1,205.22 MT | 100.00 % |
| High-Alumina | | |
| SK 35 | 129.58 MT | 17.40 % |
| SK 36 | 179.63 MT | 24.20 % |
| SK 37 | 31.90 MT | 4.00 % |
| SK 38 | 125.41 MT | 17.00 % |
| SK 39 | 2.71 MT | 0.40 % |

- Continued to next page -

| | | |
|---|---|---|
| SK 40 | 227.16 MT | 31.00 % |
| SK 41 | 20.34 MT | 3.00 % |
| SK 42 | 21.85 MT | 3.00 % |
| | 738.58 MT | 100.00 % |

Monolithics

| | | |
|---|---|---|
| Sillimanite | 0.06 MT | 0.00 % |
| Fireclay | 54.67 MT | 85.80 % |
| Chamotte | 0.10 MT | 0.16 % |
| Gunning Mix | 8.13 MT | 12.76 % |
| Mouldable | 0.81 MT | 1.28 % |
| | 63.77 MT | 100.00 % |

Overall

| | | |
|---|---|---|
| Firebricks | 1,205.23 MT | 60.00 % |
| High-Alumina | 738.59 MT | 36.80 % |
| Monolithics | 63.71 MT | 3.20 % |
| | 2,007.53 MT | 100.00 % |

(3)-4 Foundry Industry

There are 153 foundries operating in the country today. The majority (62%) are in the Metropolitan

Manila Region due to the convenience of sourcing materials and supplies and the proximity of the castings market there in the form of customers' purchasing and engineering departments. The next heaviest concentrations of foundries are in Central Visayas (Region 7, 12%) and Western Visayas (Region 6, 9%). All other regions have less 5%. There are no foundries in Regions 2,5, 8 and 10.

The foundry industry is subdivided into sectors based on the type of metal used to make castings, namely cast iron, steel, and non-ferrous. Usually the cast iron sector is further subdivided into gray iron, ductile iron and malleable iron subsectors.
Also, sometimes, the non-ferrous sector is subdivided into bronze and white metal (aluminum, zinc, lead, and tin) subsectors. Some foundries are active in two or more sectors.

There are a total of 89 operating cast iron foundries. Based on 300 working days a year, the total casting capability of all the cast iron foundries is 94,000 tonnes per year of which 72,000 tonnes is by cupola and 22,000 tonnes is by induction furnace.

In the cast steel sector, there are 22 identified steel foundries in operation. The sector's total casting capability is 35,000 tonnes using induction furnaces, and 50,000 tonnes using arc furnaces, for a total casting capability of 85,000 tonnes per year.

There are 106 foundries identified as engaging in the production of non-ferrous castings. Total production capability in bronze and in aluminum is 15,000 tonnes and 40,600 tonnes per year of good castings.

Five foundries in the cast iron sector were surveyed, one working in cast steel, one in cast bronze, and two in cast aluminum. On the basis of the annual requirements gathered for each foundry of each sector, a unit consumption per metric ton of production capacity was derived and was applied to the rest of the foundries that were not visited, to establish the annual estimated consumption of the whole foundry industry.
(Please refer to Table AN-1-6.)

The tables below present a breakdown of the foundry industry's alumina refractory requirements as per metal-working firm ad as per product type.

SCHEDULE 3-11

Foundry Industry

Requirements by Type of Metalworking Firm

| SK Rating | Volume MT | % to Total |
|---|---|---|
| Cast Iron | | |
| SK 32 | 575.51 MT | 68.02 % |
| SK 34 | 5.76 MT | 0.70 % |
| SK 36 | 100.71 MT | 11.90 % |
| SK 37 | 5.76 MT | 0.68 % |
| SK 39 | 158.27 MT | 18.70 % |
| | 846.01 MT | 100.00 % |
| Cast Steel | | |
| SK 40 | 850.00 MT | 100.00 % |

Cast Bronze

| | | |
|---|---|---|
| SK 38 | 68.00 MT | 100.00 % |

Cast Aluminum

| | | |
|---|---|---|
| SK 34 | 1.14 MT | 0.56 % |
| SK 36 | 87.47 MT | 43.09 % |
| Castables | 114.39 MT | 56.35 % |
| | 203.00 MT | 100.00 % |

SCHEDULE 3-12

Overall Breakdown

| SK Rating | Volume MT | % to Total |
|---|---|---|
| **Bricks** | | |
| Firebricks | | |
| SK 32 | 575.51 MT | 98.82 % |
| SK 34 | 6.9 MT | 1.18 % |
| | 582.41 MT | 100.00 % |

High-Alumina

| | | |
|---|---|---|
| SK 36 | 188.18 MT | 14.81 % |
| SK 37 | 5.76 MT | 0.45 % |
| SK 38 | 68.00 MT | 5.35 % |
| SK 39 | 158.27 MT | 12.47 % |
| SK 40 | 850.00 MT | 66.92 % |
| | 1,270.21 MT | 100.00 % |

Monolithics

| | | |
|---|---|---|
| Castables | 114.39 MT | 100.00 % |

Overall Breakdown:

| | | |
|---|---|---|
| Firebricks | 582.41 MT | 29.61 % |
| High-Alumina | 1,270.21 MT | 64.58 % |
| Monolithics | 114.39 MT | 5.81 % |
| | 1,967.01 MT | 100.00 % |

(3)-5 Ferro-Alloy Industry

The ferro-alloy plants covered in this study are Mari Christina Chemicals Inc., Ferrochem, Inchrome, Ferrochrome, and Metro Alloy. Metro Alloy's consumption was derived using a unit consumption figure of 0.007 MT. per production output. These five ferro-alloy plants have a combined annual alumina refractory requirement of 995.57 MT as indicated on the table below. (For other details, please refer to Table AN-1-7).

SCHEDULE 3-13

Ferro-Alloy Industry
Requirements by Type & SK Rating

| SK Rating | Volume MT | % to Total |
|---|---|---|
| **Bricks** | | |
| Firebricks | | |
| SK 32 | 129.96 MT | 46.16 % |
| SK 34 | 151.61 MT | 53.84 % |
| | 281.57 MT | 100.00 % |
| **High-Alumina** | | |
| SK 35 | 119.02 MT | 29.52 % |
| SK 36 | 39.07 MT | 9.69 % |
| SK 37 | 119.02 MT | 29.52 % |
| SK 38 | 78.16 MT | 19.40 % |

- Continued to next page -

| | | |
|---|---|---|
| SK 39 | 47.87 MT | 11.87 % |
| | 403.14 MT | 100.00 % |

Monolithics

| | | |
|---|---|---|
| Castables | 177.49 MT | 57.10 % |
| Mortars | 133.37 MT | 42.90 % |
| | 310.86 MT | 100.00 % |

Overall

| | | |
|---|---|---|
| Firebricks | 281.57 MT | 28.29 % |
| High-Alumina | 403.14 MT | 40.49 % |
| Monolithics | 310.86 MT | 31.22 % |
| | 995.57 MT | 100.00 % |

(3)-6 Sugar Industry

There 36 sugar centrals in the Philippines. Ten are located in Luzon, three in Panay, seventeen in Negros, four in Eastern Visayas, and two in Mindanao.

The industry's combined rated capacity is 169,130 tonnes of cane per day.

The sugar industry has an estimated annual refractory consumption of 811.82 MT. Three representative companies were sampled and from here a unit consumption of 0.00002 MT was derived. (Please refer to Table AN-1-8 for details.) The breakdown of the annual consumption is shown in the table.

## SCHEDULE 3-14

Sugar Industry
Requirement by per Type & SK Rating

| SK Rating | Volume MT | % to Total |
|---|---|---|
| **Bricks** | | |
| Firebricks | | |
| SK 34 | 417.19 MT | 100.00 % |
| **High-Alumina** | | |
| SK 35 | 394.63 MT | 100.00 % |

Overall Breakdown

| | | |
|---|---|---|
| Firebricks | 417.19 MT | 51.39 % |
| High-Alumina | 394.63 MT | 48.61 % |
| | 811.82 MT | 100.00 % |

(3)-7 Wood Processing Industry

There are 38 plywood manufacturers and eight veneer plants in the country.
Of the 38 plywood manufacturers, four are situated in Region 2, five in Region 4, four in Region 9, eleven in Region 10, ten in Region 11, and four in Region 12. Region 2, 9 and 10 has one veneer plant each, while Region 11 has three and Region 12 has two. No plants are operating in Region 12.

The refractory consuming equipment in the industry are boilers. Typical bricks consumed are fireclay bricks with SK ratings of 32 and 34.

The wood processing industry has an estimated alumina refractory requirement of 741.66 mt. Data gathered or the refractory requirements of three plywood manufacturers yield a unit consumption of 0.00052. (Please refer to TABLE AN-1-9.)

SCHEDULE 3-15

Wood Processing Industry

Requirements by Type & SK Rating

| SK Rating | Volume MT | % to Total |
|---|---|---|
| **Bricks** | | |
| Firebricks | | |
| SK 32 | 203.07 MT | 100.00 % |
| **High-Alumina** | | |
| SK 36 | 326.69 MT | 60.66 % |
| SK 38 | 211.90 MT | 39.34 % |
| | 538.59 MT | 100.00 % |
| **Overall Breakdown** | | |
| Firebricks | 203.07 MT | 27.38 % |
| High-Alumina | 538.59 MT | 72.62 % |
| | 741.66 MT | 100.00 % |

(3)-8 Lime Industry

The two major companies in the lime industry were covered in this study. They are Atlas Consolidated Mining and Development Corp., and Guanzon Lime & Dev. Co. Inc.

These two companies require alumina refractories of 426.70 mt per year. The table below gives a breakdown of these requirements. For details, please refer to TABLE AN-1-10.

SCHEDULE 3-16

Lime Industry
Requirement by Type & SK Rating

| SK Rating | Volume MT | % to Total |
|---|---|---|
| Bricks | | |
| Firebricks | | |
| SK 32 | 52.45 MT | 50.00 % |
| SK 34 | 52.45 MT | 50.00 % |
| | 104.90 MT | 100.00 % |

High-Alumina

| | | |
|---|---|---|
| SK 35 | 13.35 MT | 4.40 % |
| SK 36 | 276.48 MT | 91.20 % |
| SK 37 | 13.35 MT | 4.40 % |
| | 303.18 MT | 100.00 % |

Monolithics

| | | |
|---|---|---|
| Castables | 3.83 MT | 20.56 % |
| Mortars | 14.80 MT | 79.44 % |
| | 18.63 MT | 100.00 % |

Overall Breakdown

| | | |
|---|---|---|
| Firebricks | 104.90 MT | 24.58 % |
| High-Alumina | 303.17 MT | 71.05 % |
| Monolithics | 18.63 MT | 4.37 % |
| | 426.70 MT | 100.00 % |

(3)-9 Copper Smelting Industry

The Philippine Associated Smelting and Refining Corporation (PASAR), which refines the copper produced by the country's different mines, has a smelting plant with a capacity of 138,000 MT per year.

PASAR has an annual refractory requirement of 357.5 mt. The breakdown in grades and quantity are as follows:

SCHEDULE 3-17

PASAR

Breakdown as per Type & SK Rating

| SK Rating | Volume MT | % to Total |
|---|---|---|
| **Bricks** | | |
| Firebricks | | |
| SK 32 | 21.23 MT | 50.79 % |
| SK 34 | 20.57 MT | 49.21 % |
| | 41.80 MT | 100.00 % |

Monolithics

| | | |
|---|---|---|
| Mortars | 9.70 MT | 3.07 % |
| Castables | 306.00 MT | 96.93 % |
| | 315.70 MT | 100.00 % |

Overall Breakdown

| | | |
|---|---|---|
| Firebricks | 41.80 MT | 11.69 % |
| Monolithics | 315.70 MT | 88.31 % |
| | 357.50 MT | 100.00 % |

(3)-10 Coconut Oil Mills

There are 88 coconut oil mills in the Philippines. Twenty are in Metro Manila, thirty-five in the Laguna/Quezon area, five in the Bicol area, ten in the Visayas area, and eighteen in the Mindanao area.

The estimated annual average unit consumption per metric ton of production is 0.00007 MT. This brings the coconut oil mills' estimated annual alumina refractory requirements to 320.19 MT. (Please refer to Table AN-1-11). The table below gives a breakdown of these requirements as per type and SK rating.

SCHEDULE 3-18

Coconut Oil Industry

Breakdown as per Type & SK Rating

| SK Rating | Volume MT | % to Total |
|---|---|---|
| Bricks | | |
| Firebricks | | |
| SK 32 | 55.21 MT | 70.65 % |
| SK 34 | 22.93 MT | 29.35 % |
| | 78.14 MT | 100.00 % |
| Monolithics | | |
| Castables | 242.05 MT | 100.00 % |

Overall Breakdown

| | | |
|---|---|---|
| Firebricks | 78.14 MT | 24.40 % |
| Monolithics | 242.05 MT | 75.60 % |
| | 320.19 MT | 100.00 % |

(3)-11 Ceramic Industry

The ceramic industry is classified into two product types, that of tiles and sanitary ware. There are nine firms registered with the BOI for the manufacture of ceramic tiles. Alumina consumption of six of these firms was obtained. On the other hand, only Saniwares is registered for the manufacture of vitreous china sanitary ware. These ceramic manufacturers have a combined total alumina refractory requirements of 107.6 MT, as follows: (Please refer to Table AN-1-12).

## SCHEDULE 3-19

Ceramic Industry

Requirement by Type & SK Rating

| SK Rating | Volume MT | % to Total |
|---|---|---|
| **Bricks** | | |
| Firebricks | | |
| SK 32 | 12.00 MT | 27.91 % |
| SK 34 | 31.00 MT | 72.09 % |
| | 43.00 MT | 100.00 % |
| **High-Alumina** | | |
| SK 35 | 25.00 MT | 62.50 % |
| SK 36 | 15.00 MT | 37.50 % |
| | 40.00 MT | 100.00 % |

Monolithics

| | | |
|---|---|---|
| Castables | 24.00 MT | 97.56 % |
| Mortar | 0.60 MT | 2.44 % |
| | 24.60 MT | 100.00 % |

Overall Breakdown

| | | |
|---|---|---|
| Firebricks | 43.00 MT | 39.97 % |
| High-Alumina | 40.00 MT | 37.17 % |
| Monolithics | 24.60 MT | 22.86 % |
| | 107.60 MT | 100.00 % |

(3)-12 Petroleum Industry

Three of the petroleum refineries were covered in this study, namely, Philipinas Shell Petroleum Corp. Caltex (Phils.) Inc., and Bataan Refinery Corp.

These three refineries require 71.07 MT of alumina refractories per year. The table below gives a breakdown of these requirements. (Please refer to Table AN-1-13)

## SCHEDULE 3-20

Petroleum Industry

Breakdown as per Type & SK Rating

| SK Rating | Volume MT | % to Total |
|---|---|---|
| **Bricks** | | |
| Firebricks | | |
| SK 34 | 9.07 MT | 100.00 % |
| **Monolithics** | | |
| Castables | 62.00 MT | 100.00 % |

## 3.3 Supply Analysis

### 3.3.1. Local Production

(1) High-alumina refractories are 100% sourced from abroad as there is no local manufacturer of high-alumina in the country today. Local manufacturers do not have adequate quality control, production, research and development facilities to ensure the manufacture of high-quality products.
Only low-grade alumina or firebricks are being turned out domestically.

(2) Firebricks. As of Jan. 1, 1990 the Board of Investment lists only one firm engaged in the manufacture of firebricks, namely Firestone Ceramic. However, there are two other known local manufacturers of firebricks which are not registered with BOI, namely: International Ceramics Manufacturing ,(ICM) and Copengco.

Total Fireclay Production by Local Manufacturers

| | |
|---|---|
| Firestone Ceramic | 2,880 MT |
| ICM | 1,682 MT |
| Copengco | 960 MT |
| | ----- |
| | 5,522 MT |
| | ===== |

(3) Monolithics. The BOI lists only Assistco as manufacturing monolithics. There are, however, other known manufacturers of monolithics such as Jardine Nell which imports pre-mixed raw materials for manufacture in their own plant, Manila Machinery, Chester and Bagong Kaisahan. Data on these firms' capacities are not immediately available.

| Company | Product | Rated Capacity | Capacity Utilization | Actual Prod'n |
|---|---|---|---|---|
| Assistco Energy | Castables | 2000 STPY | 85% | 1,700 |

The local manufacturers' markets are limited to small smelters, foundries, and boiler accounts requiring products within the lower SK type. Local manufacturers are potential competitors to RCP in this area as they have managed to establish good relations with these industries over the last ten years. The local manufacturers are mainly producing the fireclay range because with the careful selection and quality control of raw materials, it is possible to use 100% of local raw materials to produce this range.

3.3.2 Importation of Alumina Refractory Brick

(1) Listed below is the import quantity and import unit price (C & F) for past 3 years by import country, based on import statistics.

SCHEDULE 3-21

| | 1988 | | 1989 | | 1990 (JAN-JUN) | |
|---|---|---|---|---|---|---|
| | Volume (units) | Unit Price ($) | Volume (units) | Unit Price ($) | Volume (units) | Unit Price ($) |
| China | 3,582 | 149 | 6,267 | 138 | 1,612 | 147 |
| Japan | 3,689 | 1,066 | 1,221 | 1,028 | 3,013 | 1,286 |
| Thailand | 1,016 | 334 | 2,395 | 376 | 821 | 613 |
| Taiwan | 775 | 324 | 445 | 542 | 76 | 345 |
| W. Germany | 302 | 715 | 450 | 689 | 14 | 4,446 |
| England | 451 | 674 | 327 | 751 | 76 | 858 |
| Austria | 675 | 1,208 | 22 | 1,467 | 14 | 783 |
| Malaysia | 237 | 226 | 383 | 397 | 880 | 363 |
| Others | 181 | 518 | 385 | 1,272 | 307 | 876 |
| Total | 10,908 | 479 | 11,895 | 345 | 6,813 | 790 |

(2) Listed below are import quantities for the past 3 years by industry based on import statistics.

SCHEDULE 3-22

| | 1988 MT | 1989 MT | 1990 (JAN-JU[illegible]) |
|---|---|---|---|
| Steel Industry | 4,536 MT | 3,409 MT | 639 MT |
| Cement Industry | 1,309 | 691 | 955 |
| Trading | 3,289 | 4,391 | 1,616 |
| Others | 1,774 | 3,404 | 3,603 |
| Total | 10,908 MT | 11,895 MT | 6,813 MT |

Note : In the item of "Trading", what enterprise or what field alumina refractory brick was delivered to, is unclear.

### 3.3.3 Demand as defined for the project

(1) Listed below is the demand as defined for this study project based on the result of the survey mentioned above.

SCHEDULE 3-23

| Products | Total Demand | Local Products | Shortfall |
|---|---|---|---|
| Firebrick | 4,528 MT | ----- | ----- |
| High-alumina brick | 13,599 | ----- | ----- |
| Sub Total | 18,127 | 5,520 MT | 12,607 MT |
| Monolithics | 2,930 | 1,700 | 1,230 |
| Total | 21,057 MT | 7,220 MT | 13,837 MT |

The import quantity from January, 1990 to June, 1990 is 6,813 MT as shown in Schedule 3-21. If the import volume in July to December in 1990 is same as January to June in the same year, it conforms to the estimated demand quantity.

(2) Projected Alumina Refractories Demand in MT (1990 - 1994)

SCHEDULE 3-24

| Demand Sector | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| Steel | 8,478 | 8,732 | 9,609 | 9,609 | 9,609 |

- Continued to next page -

| | | | | | |
|---|---|---|---|---|---|
| Cement | 3,160 | 4,510 | 4,794 | 5,302 | 5,302 |
| Glass | 2,007 | 1,368 | 1,368 | 1,368 | 1,368 |
| Foundries | 1,967 | 2,006 | 2,046 | 2,087 | 2,129 |
| Other Boiler Users | 1,034 | 1,057 | 1,078 | 1,100 | 1,122 |
| Ferro-Alloy | 995 | 1,519 | 1,178 | 1,292 | 1,206 |
| Sugar | 812 | 828 | 845 | 862 | 879 |
| Wood Processing | 742 | 757 | 772 | 787 | 803 |
| Rerollers | 470 | 479 | 489 | 499 | 508 |
| Lime | 427 | 439 | 445 | 454 | 463 |
| Copper Smelter | 357 | 365 | 372 | 379 | 387 |
| Coconut Oil Mills | 320 | 336 | 353 | 371 | 390 |
| Galvanizers | 109 | 116 | 122 | 128 | 134 |
| Ceramics | 108 | 113 | 119 | 125 | 131 |
| Petroleum | 71 | 76 | 82 | 88 | 95 |
| Total | 21,057 | 22,701 | 23,672 | 24,451 | 24,526 |

Assumptions Used

STEEL

NSC's total billet shop alumina refractory requirement will increase from 3376 MT to 4388.8 MT or an increase of 30% with the construction of a ladle furnace by 1992. This would bring the billet shop capacity from the present 320,000 MT to 444,000 MT by 1992.

In addition, projected consumption of the other steel mills is based on the Center for Research and Communication (CRC) and the Industry Monitoring Unit's (IMU) estimated yearly growth of 3% for basic metal from 1990 to 1992. Alumina refractory consumption of ladles and other melting equipment is assumed to be directly proportional to steel production.

CEMENT

Solid Cement will be putting up an additional kiln with 70 lining meters requiring 450 pieces of alumina bricks (SK 36 & SK 38) per meter. The yearly alumina maintenance requirements for this newly set-up kiln would be one-fourth of the total brick requirement or 30.39 MT. The expansion is expected to be completed by 1991.

Floro Cement will be increasing its daily rated capacity starting 1991 from 1500 MT to 1800 MT of clinker, correspondingly increasing its alumina refractory requirements by 20%, or from 130 MT to 156 MT.

Mindanao Portland Cement Corp. will undergo a rehabilitation program by 1990. The rehabilitation will increase MPCC's alumina refractory requirements by 20%.

Iligan Cement Corp. will be increasing its daily rated capacity from 1400 MT to 1600 MT of clinker, thereby increasing its alumina refractory requirements by 10%, or from 121 MT to 133.10 MT.

Northern Cement's 1991 expansion will require an additional 150 MT of alumina bricks and 37.5 MT (or one-fourth of its total brick requirement of 150 MT) yearly maintenance requirements for the succeeding years.

The present production capacity of the cement industry is 157.4 million 40-kg. bags or 6,296,000 MT. The Implementation of the rehabilitation and modernization program of the cement industry is expected to boost production capacity by 3.3 million MT per year beginning in 1991. As a result, an increase in the consumption for alumina refractories is also expected.

GLASS

SMC will be repairing 3 furnaces in 1990. The cold repairs will consume 250 MT of fireclay bricks and 88 MT of high-alumina bricks per furnace.

RGC's projected alumina refractory demand includes both existing and additional alumina requirements for its 400 MT float glass expansion.

REROLLERS & GALVANIZERS

An annual growth of 2% is expected for the rerollers and the galvanized iron sheet industry from 1990 to 1994.

FERRO-ALLOY

MCCI will be constructing a 15,000 MT furnace by 1991. The added equipment will initially require 370.66 MT of bricks thereby increasing MCCI's alumina refractory consumption by 284% from its original level of 130.30MT. Thereafter, yearly alumina maintenance requirements would be 35% of total brick linings for the newly-built furnace and the usual replacement bricks for the old furnace.

By 1991, Inchrome will put up an additional furnace with the same capacity as the existing furnace. Initial brick requirements would be 138.39 MT. Annual alumina maintenance requirements for the additional furnace will be the same as that of the existing furnace which is assumed to be 13.84 mt.

Ferrochem's expansion program includes the construction of another furnace and three additional ladles by the end of the year. The expansion program will bring its annual ladle brick requirements and annual maintenance requirements to 106.35 and 22.5 MT respectively for a total of 128.85 MT.

OTHER INDUSTRIES

Foundry Industry: CRC and IMU project an annual industry growth of 2% from 1990 to 1994.

Sugar Industry: The sugar industry is expected to grow yearly by 2% from 1990 to 1994.

Wood Processing Industry: A 2% annual growth is assumed for wood and cork products.

Ceramic and Lime Industry: The lime industry as well as the ceramic industry are expected to grow by 2% per year from 1990 to 1994.

Copper-Smelting Industry: From 1990 to 1994, the industry is assumed to have an average yearly growth of 2%.

Coconut Oil Milling Industry: The industry is expected to grow by 5% from 1990 to 1994.

Petroleum Industry: The market for petroleum products are expected to grow on the average by 7.7 % from 1990 to 1994.

Projected refractory consumption of the foregoing industries are assumed to be proportional to the respective industry's growth.

(3) Projected Alumina Refractories Demand per SK Rating in MT (1990 - 1994)

SCHEDULE 3-25

| | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| Fire Brick | | | | | |
| SK 28 | 25 | 26 | 27 | 28 | 29 |
| 30 | 302 | 309 | 316 | 323 | 330 |

- Continued to next page -

| | | | | | |
|---|---|---|---|---|---|
| 31 | 180 | 184 | 188 | 192 | 196 |
| 32 | 1,728 | 1,766 | 1,801 | 1,837 | 1,855 |
| 33 | 249 | 254 | 259 | 264 | 270 |
| 34 | 2,044 | 2,847 | 2,929 | 3,019 | 3,064 |
| Sub Total | 4,528 | 5,386 | 5,520 | 5,663 | 5,744 |
| High-Alumina | | | | | |
| SK 35 | 1,071 | 1,524 | 1,654 | 1,703 | 1,703 |
| 36 | 1,828 | 2,001 | 2,103 | 2,166 | 2,166 |
| 37 | 264 | ----- | ----- | ----- | ----- |
| 38 | 6,528 | 7,778 | 8,206 | 8,452 | 8,480 |
| 39 | 1,633 | 1,714 | 1,809 | 1,904 | 1,904 |
| 40 | 2,091 | 1,266 | 1,291 | 1,317 | 1,317 |
| 41 | 122 | 32 | 32 | 32 | 32 |
| 42 | 62 | 8 | 8 | 8 | 8 |
| Sub Total | 13,599 | 14,323 | 15,103 | 15,582 | 15,610 |
| Total | 18,127 | 19,709 | 20,623 | 21,245 | 21,354 |
| Monoliths | 2,930 | 2,989 | 3,049 | 3,110 | 3,172 |
| G. Total | 21,057 | 22,698 | 23,672 | 24,355 | 24,526 |

## 3.4 Sales Volume in the Project

3.4.1 The sales volume was calculated using the method stated below on the basis of the demand of alumina refractories. The estimated demand after deduction of local products from total demand of alumina refractories in 1990 is 13,837 MT (Refer to Schedule 3-23), which nearly conforms to present import volume. This volume is saleable in case of domestic production in this project.

3.4.2 In reference to the countries from which alumina refractories are now imported and prices, the following can be said (Refer to Schedule 3-21).

(1) In 1988 and 1989, the main imports were from China, Thailand, Malaysia, etc. and were low-priced ones, but in 1990 the imports from those sourcer shows a tendency to decrease, and be replaced with products from Japan. It is considered that one reason is the lower value of yen. Another is, that high-grade Japanese products came to be demanded even at high price since cheap products from China, Thailand, etc. yielded bad results in use. To know the result of performance of refractories, it takes about 6 months to one year in many cases.
The change of products sources can be reasonably understood from the above reason.

(2) Even though products are cheap and of low grade, they can be sufficiently durable depending the place and manner of use.

3.4.3 Determination of sales volume

Sales volume based on demand estimate in 1992 (Refer to Schedule 3-25) on the assumption that the operation of this project will start in 1991, can be said as follows.

(1) High alumina refractory brick almost relies upon imports. Sales volume in case of domestic production is annual 15,103 MT.

(2) For market share, RCP is expected to have a high share in marketing since RCP has its own sales channel for steel industry and cement industry in the sales of basic refractories to be present products of RCP. In general speaking, however, it is difficult to consider that the whole users will purchase from only one maker. That is, 100 % share is impossible. In consideration of the above, the maximum sales volume to be expected is as follows.

| | | |
|---|---|---|
| For steel : | 5,550 MT | (Taking market share as 80 %) |
| For cement: | 2,550 MT | (Taking market share as 90 %) |
| For others: | 1,800 MT | (Taking market share as 50 %) |
| Total | 9,900 MT | (Taking market share as 65 %) |

(3) For monolithic refractories, there are present existing makers having supply record to users. Thus it is impossible to expect to have a large part of market share.

### 3.4.4 Projected sales volume

In the event that this project completes, it will be possible to expect approximately 10,000 MT a year as high alumina refractory bricks. In consideration of the conditions stated below, the projected sales volume has been determined as per Schedule 3-26.

(1) When a plant is new the burden of depreciation and bank interest is large, and production cost is higher. In case of domestic production, it is irrelevant to make comparison with cheap imports.

(2) The present existing local manufacturers now main. produce fireclay bricks. It is assumed however that they may manufacture high alumina bricks in future. Such manufacturers have factories in Luzon Island. In order to avoid useless competition, the initial market should be mainly in Mindanao Island, and the sales program of RCP should be concentrated on steel and cement industries, to be able to use the existing sales network of RCP.

From the reason stated above, the sales volume in this project has been determined on the assumption of getting highly possible market share so as to make full operation in the 2nd year after start of operation of this project, and further taken into account so as to make expansion in future when the increase of sales volume could be forecast.

In such plan, investors will be able to make investment free from anxiety to promote early realization of this project. In this project, the plant layout is made so that the expansion could be easily carried out.

SCHEDULE 3-26

| | Steel | Cement | Others | Total |
|---|---|---|---|---|
| Market Share (%) | 60 | 60 | 30 | 49.9 |
| High-Alumina Brick | | | | |
| SK 35 | | 360 | 320 | 680 |
| 36 | | 340 | 460 | 800 |
| 38 | 3,500 | 980 | 220 | 4,700 |
| 39 | 900 | 20 | 80 | 1,000 |
| 40 | 360 | --- | --- | 360 |
| Sub Total | 4,760 | 1,700 | 1,080 | 7,540 |
| Monolithics | | | | 1,000 |
| Total | | | | 8,540 |

Remarks : Market share is the value for limited to high-alumina bricks.

## 3.5 Sales Revenue

### 3.5.1 General

The products to be manufactured and sold in the project have been so far relied upon imports. This project plans to make domestic production and supply to demanders using imports. Therefore, the sales price must be equal to or lower than present import products.
The purchase prices of the products by demanders are C and F import prices plus import duties and various expenses.
The present import prices are largely different depending on supply source and quality even if the kind of quality belongs to the same category.
Accordingly, the sales prices in this project were determined by the survey of performance of refractories though practical use and their prices.

### 3.5.2 Import Price

(1) Supplies from China, Thailand and Malaysia are especially prominent. The refractories therefrom are cheap and product grade is low. That is, the result of performance through their practical use is poor. Accordingly, their where operating conditions are severe is impossible. Therefore, their use is limited to places where the refractories will not be subject to severe conditions. So, such low-priced products were treated as outside the scope of this project on account of their low value added.

Thus, those imports were taken as outside the scope of this project. The competitive products taken as the object of the project are imports from Japan. The import price from Japan and the other costs are as follows:

SCHEDULE 3-27

| | 1988 | 1989 | 1990 (JAN-JUN) |
|---|---|---|---|
| C & F Unit Price | US$1,066 | US$1,028 | US$1,286 |
| Import Duty | 320 (30%) | 308 (30%) | 257 (20%) |
| Other Expense (10%) | 139 | 134 | 154 |
| Total | US$1,525 | US$1,470 | US$1,697 |
| Equivalent to | ₱34,770 | ₱33,516 | ₱38,692 |

(2) Listed hereunder is the result the consultant's survey of the actual purchase price to users now using Japanese products.

## SCHEDULE 3-28

| | CEMENT SK36 | CEMENT SK38 | STEEL SK38 |
|---|---|---|---|
| C & F Unit Price | US$ 934 | US$1,030 | US$ 930 |
| Import Duty (20%) | 187 | 206 | 186 |
| Other Expense | 112 | 124 | 112 |
| Total | US$1,233 | US$1,360 | US$1,228 |
| Equivalent to | ₱28,110 | ₱31,008 | ₱27,998 |

(3) Average export price from Japan for five product grades is as follows:

## SCHEDULE 3-29

| | C & F | Import Tax | Other Expense | Total | Equivalent to ₱ |
|---|---|---|---|---|---|
| SK35 | ¥122,000 | 24,400 | 14,600 | 161,000 | 26,830 |
| SK36 | ¥138,000 | 27,600 | 16,600 | 182,200 | 30,370 |
| SK38 | ¥156,000 | 31,200 | 18,700 | 205,900 | 34,320 |
| SK39 | ¥173,000 | 34,600 | 20,800 | 228,400 | 38,070 |
| SK40 | ¥212,000 | 42,400 | 25,400 | 279,800 | 46,630 |

### 3.5.3 Sales Price

The sales prices in this project were determined on the basis of present import prices.
Import duties will be reduced shortly to 10% from the present 20%. Thus, the prices of imports should be assumed to be cheap as much.
Generally speaking, when the products that had been imported in the past come to be domestically produced, consumers expect that the cost of those products should fall. However, consumers can get the following merits.
On the other hand, domestic products from a newly constructed plant that has required a large investment, have the burden of depreciation cost and bank interest forthe production facilities, resulting in high production cost.
From the circumstances stated above, the sales prices in this project were determined to be equivalent to the present C and F import price added to import duties 10% and the other costs.

(1) Easy Procedure for Purchase

Imports require a long time and troublesome work for import procedures, import license approvals, etc. In case of domestic products, purchase procedure the is easy and purchase conditions can be discussed face to face.

(2) Time of Delivery

In case of imports, order must be placed very early and a certain quantity of imports must be always

stocked in the user's own warehouse.
In case of domestic products, however, such problems are eliminated if close contact is maintenanced with the supplier.

(3) Technical Service

In the case of domestic products, consumers can receive sufficient technical service to develop and progress through mutual exchange of technology including modification of the product quality so us to be suited to the service condition of the user's kiln or furnace.

(4) Unit Sales Price

Listed hereunder is the value of unit sales price and sales revenue. The sales price is the ex-factory price.

SCHEDULE 3-30

| | Sales Volume (t/year) | Unit Price (₱/t) | Sales revenue (₱) |
|---|---|---|---|
| High-Alumina Brick | | | |
| SK35 | 680 | 24,600 | 16,728,000 |
| SK36 | 800 | 27,800 | 22,240,000 |
| SK38 | 4,700 | 31,500 | 148,050,000 |
| SK39 | 1,000 | 34,900 | 34,900,000 |
| SK40 | 360 | 42,800 | 15,408,000 |

| | | | |
|---|---|---|---|
| Sub Total | 7,540 | ------ | 237,326,000 |
| Monolithics | 1,000 | 18,000 | 18,000,000 |
| Total | 8,540 | | 255,326,000 |

## 3.6 Sales and Distribution Cost

### 3.6.1 Sales Cost

No increase in sales personnel is needed. However, advertising expenses, etc. are assumed as ₱300 per production metric ton.

### 3.6.2 Distribution Cost

Freight, commission, etc. vary depending upon customer. Thus, such cost is assumed to be collected from the end-user. Packing is assumed as palletized packing, and the packin expenses are regarded as ₱500/products metric ton.

3.6.3 Cost is as follows:

SCHEDULE 3-31

Unit ₱1,000

Sales and distribution cost

| | Unit Cost | Cost | | |
|---|---|---|---|---|
| | | Foreign | Local | Total |
| 1. Sales Cost | 0.3 | ----- | 2,562 | 2,562 |
| 2. Packing Cost | 0.5 | ----- | 4,270 | 4,270 |
| Total | | ----- | 6,832 | 6,832 |

# IV. MATERIALS AND INPUTS

## 4.1 General

Determination was made of the kind and quantity of raw materials and utilities necessary for the manufacture of alumina refractories to be produced as a result of the project, based on the following.

### 4.1.1 Basis of Selection of Raw Materials

Alumina refractories now used by consumers are all imported. Thus, selection of raw materials is to be made so as to ensure product grade equivalent to such imports and to be suited to the production facilities available. Based on the consultant's survey of refractory raw materials existing in the Philippines, the use of domestic raw materials has been taken into consideration. The result of survey for refractory raw materials existing in the Philippines is shown in Annex-4.

### 4.1.2 Utilities

On the premises of utilizing the utilities supply system now being used at the existing plant of RCP, required volume of utilities was calculated.

## 4.2 Raw Materials

Generally speaking, the raw materials stated hereunder are needed for manufacturing alumina refractories.

(1) Chamotte

Chamotte (or Grog) is produced through sintering under high temperature of green body formed to bricket condition with use of natural raw materials or synthetic raw materials. It is generally used in the blending ratio of 70 - 80% depending upon product grade.

(2) Bonding Clay

Natural refractory clay is generally used as bonding clay. The clay gives workability at the time of product forming, and performs the function of bonding by means of sintering at the time of firing. Therefore, the clay is desired to have high plasticity and high sintering.

(3) Rejected brick

Defective products after firing of refractory brick are returned, and can be re-used as raw materials.

### 4.2.1 Domestic Raw Materials

The conclusion of the survey on domestic raw materials is as follows.

(1). Suitability for refractory raw materials

In order to determine the required characteristics of refractory raw materials, it is better that the contents of $Al_2O_3$ should be much and Na2 and K2 should be less in a possible extent. The contents of $Al_2O_3$, $Na_2O$ and $K_2O$ after removal of ignition loss, of the sample tested this time are as follows.

| Name of Sample | $Al_2O_3$(%) | $Na_2O_3$ & $K_2O$(%) |
|---|---|---|
| Talakag WC(R) | 57.60 | 0.77 |
| " WC(B) | 54.53 | 0.79 |
| Gingoog WC | 57.09 | 0.73 |
| Tagranao WC | 54.88 | 0.50 |
| Maribbog WC | 55.86 | 0.57 |
| Marawi BC | 52.51 | 0.75 |
| Sta. Elena WC | 36.61 | 7.07 |
| Dipolog WC | 31.43 | 1.23 |
| North Gigantes WC | 26.37 | 2.27 |
| San Dionisio BC | 39.25 | 0.92 |
| Lemery BC | 35.43 | 0.98 |
| Shinukunipan BC | 42.89 | 0.85 |
| Magpet WC | 45.49 | 0.72 |
| Infanta WC | 41.46 | 1.45 |

As seen from the list stated above, Talakag WC, Gingoog WC, Tagranao WC, Maribbog WC and Marawi BC are the most suitable for raw materials for alumina refractories, and the next suitable ones are Shinukunipan BC and Magpet WC.

(2). Raw materials for chamotte

The contents of $Al_2O_3$ of domestic raw materials are maximum 46%. In case that chamotte is manufactured, the contents of $Al_2O_3$ of chamotte are maximum 57%. Among the products planned in this project, the usable quantity of such grade of chamotte is approximately 15% of the whole use quantity of raw materials.

Meanwhile, chamotte is not manufactured in the Philippines at present, so that chamotte-making facilities must be separately installed for the purpose of using chamotte made of domestic raw materials. In case that chamotte-making line is newly installed, minimum economical production scale unit is annual 6,000 to 10,000MT depending upon national situation. Meanwhile, possible use quantity of chamotte in this project with use of domestic raw materials is small to be approximately 1,500MT a year, so that there is no merit for new installation of chamotte-making facilities.

From the reason stated above, chamotte has been planned to be imported for the whole quantity.

In the event that a merit for new installation of chamotte-making facilities has been ascertained in future through the increase of consumption of domestic raw materials or study for highly possible export of chamotte, it will be better to study the use of domestic raw materials.

Needless to say, the use of chamotte made of domestic raw materials will naturally save foreign exchanges and lower the production cost. From the matters stated above, it is better to do effort for the following after start of the operation of this project.

(2)-1 Exploitation of high quality domestic raw materials

In the raw materials discovered at present, the quantity usable for this project is approximately 15%. If further high quality raw materials are discovered and developed in future, the use quantity of domestic raw materials will increase.

(2)-2 Increase of consumption of domestic raw materials Research and development of expansible use of the raw materials having been discovered should be promoted.
The quality of refractories deviates depending upon the operation condition of user's facilities. With meeting user's requirements, efforts to increase use quantity of local raw materials should be done.

(3) Bonding clay
Bonding clay does not need special treatment. Accordingly, domestic raw materials can be used. The names of raw materials usable for this project are listed in the preceding item 4.2.1.(1). Among

them, Talakag WC being exploited and mined at the nearest place from the plant site of this project, has been determined for use.

(4) Al2O3 content in maximum is approximately 46%. (Approximately 57% in case of deduction of loss of ignition) In case that raw materials are used as chamotte, the usable quantity is approximately 15% of total raw materials. New construction of a chamotte production line has no merit. Therefore, the entire volume of chamotte shall be imported. In future, the replacement with domestic raw materials can be considered if there is a sufficiently high degree of certainty that it will be profitable.

(5) Talakag clay is usable as bonding clay because it is available from a conveniently-located source and is of adequate quality.

### 4.2.2 Imported Raw Materials

The quality of raw materials to be imported is stable as they are broadly used in the world. In the project, it is assumed that the raw materials stated below shall be imported.

(1) Synthetic Alumina Chamotte (S) : Japan
Al2O3 Content, Min. 90%

(2) Synthetic Alumina Chamotte (H) : Japan
Al2O3 Content, Min. 75%

(3) Calcined Shell Clay : China
Al2O3 Content, Min. 80%

(4) Calcined Frint Clay (H) : China
Al2O3 Content, Min. 48%

(5) Calcined Frint Clay (L) : China
Al2O3 Content, Min. 42%

(6) Bauxite Powder : China
Al2O3 Content, Min. 80%

(7) Shell Clay (Raw) : China
Al2O3 Content, Min. 70%

(8) Alumina Cement : Japan or China

(9) Special Binder : Japan

4.2.3 The requirement and price of raw materials in quantities conforming to requirements at the time of full use of production capacity are shown hereunder.

SCHEDULE 4-1

Unit ₱1,000

Raw Materials

| No. | Q'ty | Unit | Description | Unit Price | Foreign | Local | Total |
|---|---|---|---|---|---|---|---|
| 1. | 780 | T | Synthetic Alumina Chamotte (S) | 17.9 | 13,962 | --- | 13,962 |
| 2. | 1,660 | T | Synthetic Alumina Chamotte (H) | 14.2 | 23,572 | --- | 23,572 |
| 3. | 2,460 | T | Calcined Shell Clay | 4.1 | 10,086 | --- | 10,086 |
| 4. | 1,270 | T | Calcined Frint Clay(H) | 3.1 | 3,937 | --- | 3,937 |
| 5. | 470 | T | Calcined Frint Clay(L) | 2.6 | 1,222 | --- | 1,222 |
| 6. | 1,230 | T | Bauxite Powder | 14.2 | 17,466 | --- | 17,466 |
| 7. | 520 | T | Shell Clay (Raw) | 2.0 | 1,040 | --- | 1,040 |
| 8. | 150 | T | Alumina Cement | 12.5 | 1,875 | --- | 1,875 |
| 9. | 360 | T | Special Binder | 80.0 | 2,880 | --- | 2,880 |
| 10. | 220 | T | Rejected Brick | --- | --- | --- | --- |
| 11. | 850 | T | Refractory Clay | 1.0 | --- | 850 | 850 |
| | 9,970 | | SUB TOTAL | --- | 76,040 | 850 | 76,890 |

-- Continued to next page --

| | | | | | | |
|---|---|---|---|---|---|---|
| 8,900 | T | Inland Freight | 0.2 | --- | 1,780 | 1,780 |
| | | Import Duty (10%) | --- | --- | 7,604 | 7,604 |
| | | TOTAL | | 76,040 | 10,234 | 86,274 |

## 4.3 Utilities

### 4.3.1 Electric Power

Consumption of power at most of the common-use facilities such as administration office, laboratory, maintenance workshop, etc., can be ignored as a cost factor for this study as the incremental demand of the project is not great and the costs will be included in overall overhead of the company. Note in this connection that pars of company overhead will be charged to the new product line.

### 4.3.2 Fuel Oil

Fuel oil means bunker oil for firing of products.

4.3.3 Diesel Oil

Diesel oil is used for heat source of dryer.

4.3.4 Materials of Mould

The forming of products is by press. In the forming, the metal moulds used are made in the company's own factory, but the materials for them must be separately purchased.

4.3.5 The utilities requirement is shown hereunder.

Schedule 4-2

Unit ₱1,000

Utilities

| No. | Q'ty | Unit | Description | Unit Price | Local Currency |
|---|---|---|---|---|---|
| 1. | 2,150 | KWHx1,000 | Electric Power | 1.15 | 2,472.50 |
| 2. | 990 | KL | Fuel Oil | 3.30 | 3,267.00 |
| 3. | 120 | KL | Diesel Oil | 4.70 | 564.00 |
| 4. | 6 | KL | Machine Oil | 28.98 | 173.88 |

- Continued to next page -

| | | | | |
|---|---|---|---|---|
| 5. | 0.2 KL | Grease | 40.00 | 8.00 |
| 6. | 6 KL | Gasoline | 6.42 | 38.52 |
| 7. | 1 Lot | Mould Materials | --- | 2,850.00 |
| | | TOTAL | | 9,373.90 |

# V. LOCATION AND SITE

## 5.1 General

The plant site of the proposed project would utilize some of the space of the premises of the existing plant, and adjacent newly-purchased land. The site is located in Iligan city, Mindanao.

## 5.2 Outline of Iligan City

Iligan city is located at the north seaside of the center of Mindanao. It takes 1.5 hours to fly from Manila to Cagayan de Oro by jet. The 92 km from Cagayan de Oro to the plant takes 1 hour by highway.

Iligan city is an industrial district of Mindanao, and has many factories. The population is 155,000. The climate is rainy from August to December. January to July is the dry season.

Existing Factories include the following :

National Steel Corporation
Refractory Corporation of the Philippines
Iligan Cement Corporation
Floro Cement Co.
Mindanao Cement Co.
Maria Cristina Chemical

Mabhuy Vinyl
Electro Alloy
Mindanao Steel
Paper Industries Corporation of the Philippines
Philippine Eslon Pipe
Coco Oil Mill

## 5.3 Conditions of Plant Site

In addition to being adjacent to the existing RCP plant, the selection is justified by the following factors in addition to the availability of access to existing facilities ;

### 5.3.1 Mining Site of Raw Materials

The raw materials suitable for refractories are deposited in the Mindanao district. A deposit is found in Davao and Cagayan de Oro district. The site is convenient for transportation by both highway and sea.

### 5.3.2 Harbor Facilities

Harbors are located at 5km, 13km and 19km from RCP plant. Wharfs there can admit vessels of up to 40,000 DWT. Raw materials and products are now being shipped or received through these harbors. Since the Philippines consists of many islands, and customers are dispersed among those islands, harbor facilities come to a key factor in determining utility or desirability of a plant site.

### 5.3.3 Transport to Customer

National Steel is the biggest customer of refractories in the Philippines. About 60% of the products of the project are to be supplied to National Steel. The mill of National Steel is located only 19 km from RCP. Near the factory, three cement plants are located.
The advantageous position gives a great benefit for transportation. Other customers include foundries and glass manufacturers located in Cebu Island, a cement manufacturer located in Davao, and a cement manufacture located near Manila. Transportation fee to those customers is not so expensive if ships are used.

### 5.3.4 Electricity

Iligan district has the best electric power circumstances in the Philippines.
Electricity is available at the cheapest price.

### 5.3.5 Manpower

Skilled works from the RCP plant can be used. In addition, a project for establishing a ceramic center at Iligan district is proceeding, as suitable quality raw materials for ceramics are produced in Mindanao. If the ceramic center to be planned in Iligan city, Mindanao is operated, ceramic engineers can easily be employed.

## 5.4 Purchase of Land and Land Preparation

### 5.4.1 Purchase of land

The existing RCP plant does not have enough available unused space for the proposed expansion, so new purchase of a plot of land is needed.

The land adjacent to the existing plant is occupied by a palm forest at present, and the land owner has the intention to sell the land, so, the purchase of land is expected to be done without any hindrance. The land lies is on the opposite side of a main national road behird the existing plant, and does not have any access to the road. Thus, it is expected that the land will be able to be purchased at a relatively cheap price.

### 5.4.2 Land Preparation

The projected area in the premises of the existing plant is nearly flat but presents a gentle slope, so that ground leveling is needed. No difficulty is expected in preparing the site.

### 5.4.3 Land and Purchasing Cost

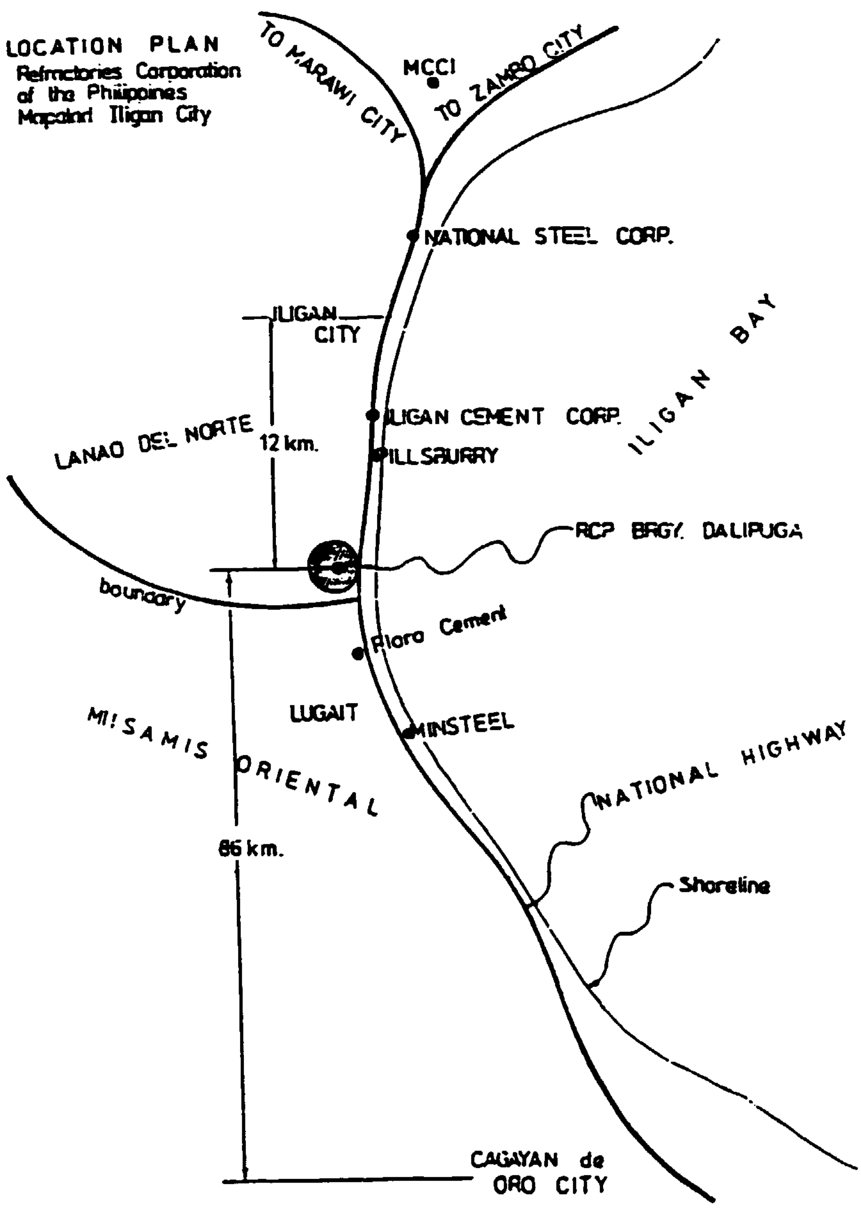
SCHEDULE 5-1

Unit ₱1,000

Land

| Q'ty | Unit | Description | Unit Cost | Foreign | Local | Total |
|---|---|---|---|---|---|---|
| 4,000 | M2 | New area | 0.5725 | ----- | 2,290 | 2,290 |
| 10,000 | M2 | Existing area | | ----- | ----- | ----- |
| 14,000 | | Total | | | | 2,290 |

FIG 5-1


LOCATION PLAN
Refractories Corporation
of the Philippines
Mapalad Iligan City
TO MARAWI CITY
MCCI
TO ZAMBO CITY
NATIONAL STEEL CORP.
ILIGAN
CITY
ILIGAN CEMENT CORP.
PILLSBURRY
LANAO DEL NORTE
12 km.
ILIGAN BAY
RCP BRGY. DALIPUGA
boundary
Iloro Cement
LUGAIT
MINSTEEL
MISAMIS ORIENTAL
NATIONAL HIGHWAY
86 km.
Shoreline
CAGAYAN de
ORO CITY

# VI. PROJECT ENGINEERING

## 6.1 GENERAL

The project was planned as an expansion of a plant that is now in operation. Accordingly, the existing facilities, as stated below, can be utilized after expansion. Only changes required by expansion are noted herein.

### 6.1.1 Administration Office

### 6.1.2 Laboratory

### 6.1.3 Maintenance Workshop

Minor-scale expansion is necessary.

### 6.1.4 Electric Supply System

The existing transformer unit is of sufficient capacity. The only requirement is for a distribution line originating from the 440 volt low tension receiving panel.

### 6.1.5 Fuel Oil Supply System

Only extension of the piping is needed.

### 6.1.6 Water Supply System

Extension of piping is needed.

## 6.2 Technology

The existing plant has a production line for basic refractories. Basic refractories and alumina refractories plants have many common aspects in regard to production technology and application technology. However, characteristics of the two refractories are so different that technology has to be acquired for alumina refractories to be produced as envisioned by this project. The technology must come from a foreign country. It is recommended that technology be acquired as part of a technical assistance agreement rather than be considered to merely be a matter of licensing. If such an agreement is used, the following are important.

### 6.2.1 Application and Performance

Refractory products are used under high temperature and are affected by slag, clinker, gas, etc.
Conditions of use in many cases vary even in the use of refractories under same purpose and the result of performance also differs depending upon user's use conditions.
In order to meet a user's requirement, special efforts are needed for selection of raw materials, distribution of grains, controle of manufacturing conditions, etc.
Refractory products, being fundamental materials for key

industries, must be as low in price as possible. Therefore, cheap natural raw materials must be used as much as possible. The firm supplying technical assistance should have sufficient experience in production planning of alumina refractories to insure optimum cost control through sourcing and selection of raw materials.

### 6.2.2 Quality Control

For the purpose of manufacturing uniform products at low cost, quality control is indidpensable.
Accordingly, production know-how inclusive of such technology should be acquired.

### 6.2.3 Supervising

(1) At the time of the construction of the plant, supervisory personnel for the erection and installation of machinery and equipment should be despatched from machine makers in the foreign countries from whom critical machinery were purchased.

(2) For a half year after the start of operation, a supervising engineer from the technical partner should be despatched to supervise the operation of the plant.

### 6.2.4 Estimate of Consulting Fee and Royalty

The direct cost of technical assistance is estimated as shown in Schedules 6-1 and 6-2. The basis of estimation is the prevailing situation in Japan.

SCHEDULE 6-1

Unit ₱1,000

| Consulting Fee | | | |
|---|---|---|---|
| | Foreign | Local | Total |
| Engineering Fee for Local Suppliers | 1,540 | ----- | 1,540 |
| Engineering Fee for Building | ----- | 700 | 700 |
| Supervising Fee for Erection and Installation | | | |
| Salary for 32 m/month | 7,385 | ----- | 7,385 |
| Travel allowance | 138 | ----- | 138 |
| Air fare for 9 persons | ----- | 210 | 210 |
| Living Expense | ----- | 160 | 160 |
| Total | 9,063 | 1,070 | 10,133 |

SCHEDULE 6-2

Unit ₱1,000

| Royalty | |
|---|---|
| Initial Royalty | 3,080 |
| Running Royalty | |
| Years 1 - 2 | 0 % |
| Years 3 - 4 | 2.0 % |
| Years 5 - 7 | 3.5 % |

## 6.3 Production Process

### 6.3.1 General Description

Fig. 6-1 shows a flowsheet of the production process. The production process is basically the same throughout the world. In that sense, there are no special characteristics to be described. Described hereunder is the basic process employed for producing high quality refractories.

(1) Grinding and Mixing

Appropriate grain size and blending ratio are important factors influencing the quality of the products.

Raw materials are to be ground into grains of the specified dimensions. Then those grains are separated by material and grain size. The classified grains are mixed according to a specified blending ratio, and bathes of standard quantities are weighed. An automatic weighing system controlled by computer is to be introduced.

(2) Forming

Forming methods include wet forming, semi-dry forming and dry forming. Except for special shape bricks, dry forming by a high pressure hydraulic press is to be employed to obtain accurate shape and high quality of products. Special bricks are to be made by manual moulding.

(3) Firing

Firing is the last and important process. A high performance tunnel kiln controlled by a computer is to be employed for firing to obtain uniform and economical products.

(4) Research and Development Facilities
In keeping with the improvement of technology and in view of the higher quality to be achieved by the project, it is deemed advisable that the company provide for reserch and development work.

### 6.3.2 Crushing

Crushing in conducted as follows;

(1) Chamotte and stony materials are crushed by a jaw crusher.

(2) Raw materials, separate or partly mixed, are charged by a pan feeder to the impact crusher.

(3) The material thus ground by the impact crusher is roughly sieved through a bar screen.

(4) Coarse grains of materials are further sieved by a vibrating screen and transported on a belt conveyor to storage hoppers where they are separated by material and grain size.

### 6.3.3 Mixing and Kneading (Refractory Brick)

Mixing and Kneading are performed as follows;

(1) Weighed and ground materials are transported by a forklift equipped with a bucket and thrown by a skip hoist into a pan mixer for mixing and kneading.

(2) Kneaded material is transported by a forklift with bucket to a press.

### 6.3.4 Forming

Forming is done as follows;

(1) Fully-Automatic Hydraulic Oil Press

This press is used when more than 1,000 pieces per lot are to be formed, or SK36 and above or large bricks (15kg and above in unit weight), are to be formed.

The prepared materials is charged by a skip hoist into the press charging hopper. The automatic-formed green body is mounted on a drying cart.

(2) Friction Press

This press is used for forming small lots or SK35 and below or small bricks.

The prepared mass is charged into the automatic weighing system for weighing the mass per 1 brick. Forming is manual. The green body thus formed is mounted on a drying cart. Tube-shaped products are formed by a long-stroke friction press.

(3) Manual Molding

The molding is used for complicated shapes or small lots. Prepared mud is placed in a wooden mold and pressed and molded by a pneumatic rammer. Green body is mounted on drying cart.

### 6.3.5 Drying

(1) Burned Brick

Green body on a drying cart is dried in a natural environment for one day and then transported into chamber dryer and to be dried for 2 days.

(2) Unburned Brick

Unburned bricks are dried naturally on a drying cart for one day and then dried in a hot drier for one day. The dried bricks are then sorted and inspected for shipment as finished products.

### 6.3.6 Firing

Firing is done by an automatic tunnel kiln. Green body is mounted on a kiln car, dried by tunnel drier as the final stage of drying and transported into the tunnel kiln for firing. Conditions of firing (firing temperature, hours, etc.) are determined according to the required product quality.

Firing is done in groups, as follows:

| | | |
|---|---|---|
| A group | : | SK39 - SK40 |
| B group | : | SK37 - SK38 |
| C group | : | SK35 - SK36 |

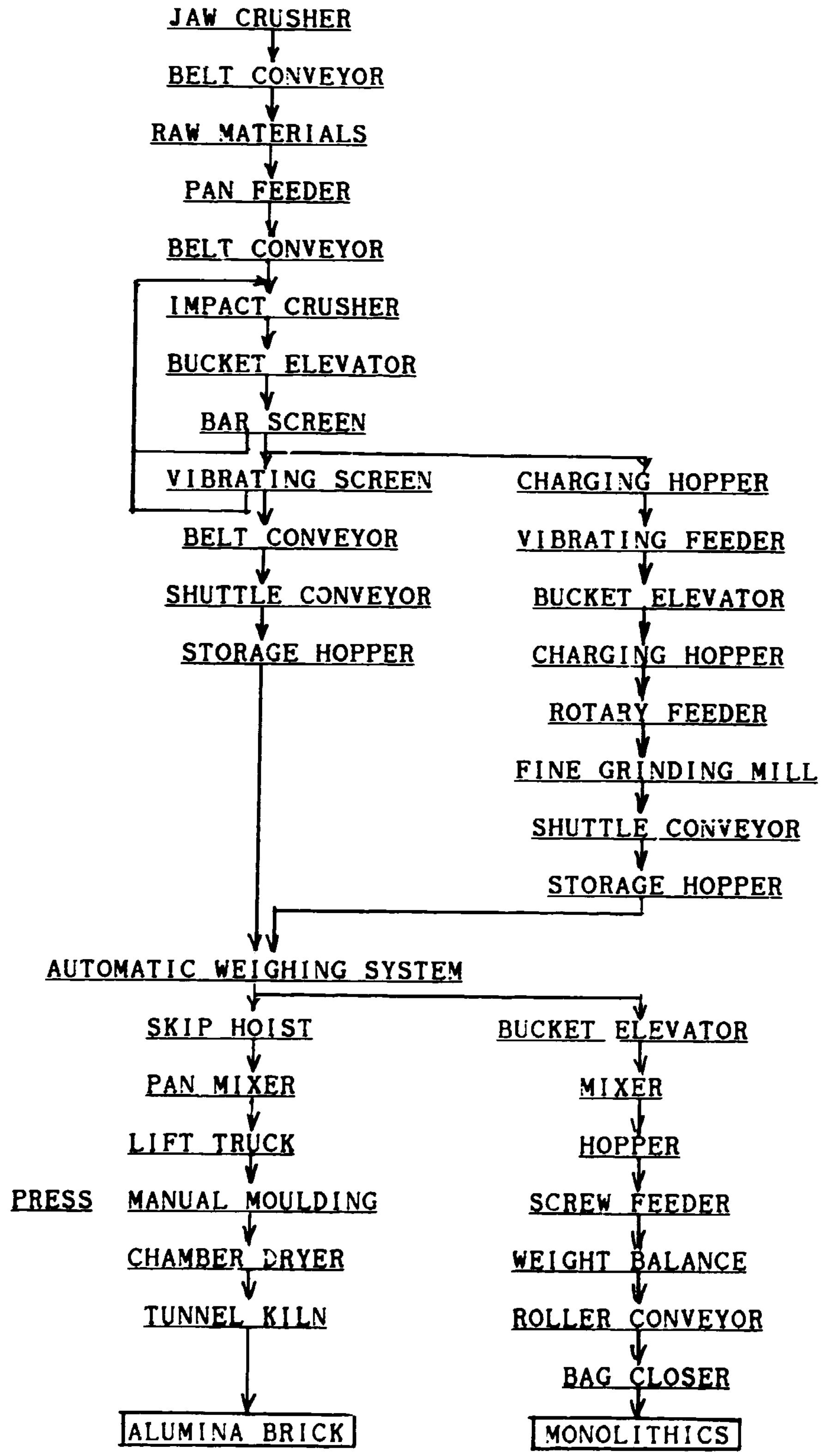
6.3.7 Monolithic Refractories

Monolithic refractories including refractory mortar are classified, in the grinding process, by raw materials and grain size. Then they are mixed based on an appropriate blending ratio and packed.

## 6.4 Machinery and Equipment

6.4.1 Lists 6-1, 6-2 and 6-3 show technical specifications of machinery and equipment in accordance with the production process stated in item 6.2.

Fig. 6-1 FLOWSHEET OF ALUMINA REFRACTORIES



LIST 6-1

IMPORT
SPECIFICATION OF MACHINERY AND EQUIPMENT
(PRODUCTION)

(A) CRUSHING SECTION

1. PAN FEEDER : 1 set

| | | |
|---|---|---|
| Type | : | Continuous feeding pan type feeder |
| Dimension | : | 2,000 W x 3,000 L mm |
| Capacity | : | 8 t/hr. |
| Motor | : | 5.5 kw |

2. JAW CRUSHER : 1 set

| | | |
|---|---|---|
| Type | : | Single toggle crusher |
| Feed opening | : | 400 x 250 mm |
| Outlet clearance | : | 20 - 50 mm |
| Capacity | : | 8 t/hr. |
| Motor | : | 11 kw |

3. BUCKET ELEVATOR : 1 unit

| | | |
|---|---|---|
| Type | : | Continuous discharging, chain driving type |
| Capacity | : | 8 t/hr. |

Consisting of;

1 set - 18,000 H mm with 3.7 kw motor

1 set - 10,000 H mm with 1.5 kw motor

4. IMPACT CRUSHER : 1 set

| | | |
|---|---|---|
| Type | : | Impeller type |
| Capacity | : | 8 t/hr. |
| Feed opening | : | 240 x 680 mm |
| Motor | : | 22 kw |

5. VIBRATING SCREEN : 1 set

| | | |
|---|---|---|
| Type | : | Dust proof, 2-stage type |
| Capacity | : | 4 - 6 t/hr. |
| Size of trough | : | 1,200 x 3,500 L mm |
| Motor | : | 2.2 kw x 2 sets |

6. FINE GRINDING MILL : 1 set

| | | |
|---|---|---|
| Type | : | Vertical type with high efficiency-fine grinding mill |
| Capacity | : | 2 - 3 t/hr. |

Consisting of;

1 set - Grinding mill with 75 kw motor
2 sets - Rotary feeder with 3.7 kw motor
1 set - Cyclone
1 set - Bag filter with 0.4 kw motor (2 sets)
1 set - Exhaust fan with 75 kw motor
1 set - Operation and control panel

7. SHUTTLE CONVEYOR : 4 sets

| | | |
|---|---|---|
| Type | : | Roller carrier reversible type |
| Capacity | : | 6 t/hr. |
| Dimensions | : | 350 W x 4,000 L mm |
| Motor | : | 1.5 kw and 0.4 kw : one each |

8. DUST COLLECTOR : 1 set

Capacity : 400 M3/min.

Consisting of;

1 set - Body with bag filter

1 set - Rotary valve with 0.75 kw motor

1 set - 400 M3/min. turbo fan with 37 kw motor

9. VIBRATING FEEDER : 2 sets

| | | |
|---|---|---|
| Type | : | Trough vibrating type |
| Capacity | : | Max. 10 t/hr. |
| Power | : | 0.15 kw |

(B) MIXING AND KNEADING SECTION

1. CONTINUOUS WEIGHING AND TRANSPORTATION SYSTEM : 1 unit

Type : Continuous weighing type

Consisting of;

- 2 sets - Automatic belt scale
- 2 sets - 600 W x 9,000 L mm reversible conveyor unit with 1.5 kw motor
- 1 set - Control panel with accessories
- 8 sets - Vibrating feeder with 0.15 kw vibration power
- 8 sets - Screen feeder with 0.75 kw motor
- 1 set - 600 W x 7,000 L mm belt conveyor with 1.5 kw motor (reversible type)
- 1 set - 600 W x 8,000 L mm shuttle conveyor with 1.5 kw and 0.4 kw motor
- 1 set - Bucket elevator with 3.7 kw motor (height approx. 10,000 mm)
- 20 sets - Leveler with 3 W motor

2. ROTATING PAN MIXER : 3 sets

Capacity : 500 kg/batch

Consisting of;

- 1 set - Pan with roller and blade
- 1 set - 15 kw G. M.
- 1 set - Operation panel

3. AUTOMATIC TRANSPORTATION SYSTEM : 1 set

| | | |
|---|---|---|
| Capacity | : | 1 t/batch |
| Electric motor | : | 15 kw and 2.2 kw |

Consisting of;
- Elevator lift
- Transfer system
- Discharge device
- Others

4. DUST COLLECTOR : 3 sets

| | | |
|---|---|---|
| Capacity | : | 30 M3/min. |
| Motor | : | 3.7 kw |

5. BAG CLOSER : 2 sets

Portable type

## (C) FORMING UNIT

### 1. FULL AUTOMATIC HYDRAULIC PRESS : 2 sets

| | | |
|---|---|---|
| Type | : | Center moulding type |
| Pressure | : | 630 tons |

Consisting of;

- 1 set - Press body
- 1 set - Hydraulic and valve unit
- 1 set - Charger system
- 1 set - 37 kw, 3.7 kw, 2.2 kw, 0.4 kw and 0.065 kw motor each one (1) set
- 2 sets - Pan feeder with 1.5 kw motor
- 1 set - Belt conveyor with 0.75 kw
- 1 set - Operation panel

### 2. FULL AUTOMATIC FRICTION PRESS : 1 set

| | | |
|---|---|---|
| Type | : | Friction hydraulic combination high pressing type press |
| Capacity | : | Max. 1,500 tons<br>Normal 750 tons |
| Press stroke | : | Max. 450 mm |
| Knock-out power | : | 150 tons |
| Knock-out stroke | : | 800 mm |

Consisting of;

- 1 - Press body
- 1 - Hydraulic unit
- 1 - Knock-out unit
- 1 - Mould transfer unit (Shuttle system)

4 - Motors

55 kw x 1 set

30 kw x 2 sets

5.5 kw x 1 set

1 - Operation panel with accessories

3. METAL MOULD : 1 unit

Consisting of;

2 sets - For fully automatic hydraulic press

1 set - For fully automatic friction press

4. PNEUMATIC RAMMER : 6 sets

| | | |
|---|---|---|
| Total length | : | 485 mm |
| Piston diameter | : | 25.4 mm |
| Stroke | : | 102 mm |
| Hose | : | 12.7 mm |
| Air consumption | : | 0.45 M3/min. |

5. AIR COMPRESSOR : 2 sets

| | | |
|---|---|---|
| Max. type pressure | : | Screw type compressor |
| Type | : | Air cooled type |
| Capacity | : | 3.4 M3/min. |
| Motor | : | 22 kw |

(D) DRYING AND FIRING SECTION

1. CHAMBER DRYER : 1 set

| | | |
|---|---|---|
| Dimension | : | 6,000 W x 28,000 L x 1,800 H mm |
| No. of drying cars in the dryer | : | 132 |
| No. of trucks | : | 6 |
| Pushing system | : | Chain pusher system with 0.75 kw motor ( 6 sets ) |

2. HIGH TEMPERATURE DRYER : 1 set

| | | |
|---|---|---|
| Type | : | Shuttle type dryer |
| Overall dimension | : | 750 W x 4,000 L x 2,000 H mm |

Consisting of;

1 - Chain pusher with 0.4 kw motor
4 - Kiln car
1 - Fan with 0.75 kw motor
1 - Heating equipment ( 120 kw )
1 - Panel with accessories
1 - Steel materials

3. HIGH TEMPERATURE TUNNEL KILN : 1 set

| | | |
|---|---|---|
| Length | : | 70,000 mm |
| Output capacity | : | 25 tons/day |
| Firing temperature | : | Max. 1,500 CD |
| No. of kiln car | : | 80 |

Consisting of;

1 unit - Refractories

- 1 lot - Refractory brick (SK 30 - 40)
- 1 lot - Refractory mortar (SK30 - 40
- 1 lot - Super high insulating brick
- 1 lot - High insulating brick
- 1 lot - Refractory castable
- 1 lot - Insulating materials

1 unit - Kiln car and pusher

- 80 sets - Kiln car
- 3 sets - Transfer car
- 1 set - Hydraulic power pusher with 0.75 kw

1 unit - Combustion equipment

- 16 sets - Burner with accessories
- 16 sets - Burner tile
- 16 sets - Oil filter
- 1 set - Double type oil strainer
- 2 sets - Oil gear pump with 0.4 kw motor
- 1 set - Relief valve
- 1 set - Oil heater

1 unit - Air dynamic apparatus

- 2 sets - Turbo blower
- 2 sets - Exhaust fan
- 2 sets - Cooling fan
- 2 sets - Under-car cooling fan
- 2 sets - Waste heat fan

1 unit - Kiln structural steel

- 1 lot - Rail and fittings
- 1 lot - Under-car cooling nozzle
- 1 lot - Under-car cooling damper
- 1 lot - Sand box

1 lot - Relief board

1 lot - Cooling cover

1 lot - Peep hole cover

1 unit - Measuring instrument

2 sets - Thermo-recorder

2 sets - Thermo-indicator

24 sets - Thermo-couple

1 set - Optical pyrometer

6 sets - Manometer

1 lot - Compensation lead wire

1 set - Cold junction compensation

1 set - Control panel

LIST 6-2

IMPORT
SPECIFICATION OF MACHINERY AND EQUIPMENT
(AUXILIARY)

(AA) FACILITIES OF ELECTRIC SUPPLY

1. 440 V LOW TENSION RECEIVING, SUBSTATION AND MAIN-LINE EQUIPMENT : 1 unit

Consisting of;

For secondary main cubicle
For bus-duct
For annunciator cubicle
For 440 V distribution cubicle
For battery & battery charger
For condenser feeder cubicle
For low-tension power condenser

2. DISTRIBUTION AND CONTROL PANEL : 1 unit

| | | |
|---|---|---|
| Motive power | : | 3 phase, 3 wire, 440 V, 60 Hz |
| Control circuit | : | 1 phase, 2 wire, 220 V, 60 Hz |
| Starting system | : | Direct starting (not less than 19 kw)<br>Star-delta starting (19 kw and above) |
| Control system | : | Each motor started will be magnetic combination type with |

| | | |
|---|---|---|
| | | MCB magnetic contactor and thermal relay |
| Panel type | : | Indoor use, metal enclosed, vertical self starting type and/ or wall mounting type |

Consisting of;

1 - Motor control panel
- For chamotte making unit
- For crushing unit
- For mixing and kneading unit
- For forming unit
- For drying unit
- For firing unit

1 - Supervisory operation desk
- For crushing, mixing & kneading unit
- For chamotte making unit

3. LIGHTING EQUIPMENT : 1 unit

Consisting of;

Lighting transformer

Local lighting distribution panel

4. EMERGENCY POWER GENERATOR (200 KVA) : 1 unit

Consisting of;

1 - Diesel engine

1 - 3 phase A.C. synchronous generator

1 - Generator cubicle

1 - Engine control panel, battery & battery charger

(AB) MAINTENANCE

1. SURFACE GRINDER : 1 unit

| | | |
|---|---|---|
| Size of work table | : | 1,000 x 500 |
| Max. longitudins movement | | |
| | : | 1,180 x 570 mm |
| Dimensions of grinding wheel | | |
| | : | 3,550 ø x 50 mm |
| Electric motor | : | 5.5 kw x 2 sets |
| | | 0.75 kw and 0.58 kw |

Accessories
- 1 - Magnetic chuck
- 1 - Dust collector and coolant equipment with magnetic separator
- 1 - Grinding wheel balancing apparatus
- 3 - Grinding wheel balancing arbor
- 2 - Grinding wheel

2. DRILLING MACHINE : 1 unit

| | | |
|---|---|---|
| Stroke | : | 503 mm |
| Drill | : | 40 mm |
| Max. distance | : | 770 mm from spindle to table |
| Electric motor | : | 1.5 kw |

Accessories
- 1 - coolant pump
- 2 - Diamond core
- 1 - Quick chuck and drill

3. MILLING MACHINE : 1 unit

| | | |
|---|---|---|
| Size of table | : | 1,650 x 380 mm |
| Max. movable distance | : | 920 x 350 x 450 H mm |
| Electric motor | : | 7.5 kw, 1.5 kw and 0.125 kw |
| Accessories | : | Hydraulic vise, counter, round cutter, side cutter |

4. LATHE MACHINE : 1 unit

Swing over bed : 500 mm

Height from floor surface to counter
: 1,000 mm

Max. distance between centers
: 1,300 mm

Electric motor : 5.5 kw

Accessories

1 - Scroll chuck
1 - Face plate
2 - Center sleeve
1 - Charge gear wheel
1 - Indicator gear wheel
1 - Tools set

5. BENCH GRINDER : 1 unit

| | | |
|---|---|---|
| Type | : | Double type |
| Size of grinding wheel | : | 2,550 x 25 mm |
| Electric motor | : | 0.75 kw |
| Accessories | : | Grinding wheel (6) |

6. POWER HACKSAW : 1 unit

| | | |
|---|---|---|
| Max. cutting size | : | 1 unit |
| | | 2,100 mm (for round) |
| | | 190 x 190 mm (for square) |
| Motor | : | 1.4 kw |
| Accessories | : | Blade (20) |

7. MAINTENANCE TOOLS : 1 lot

Consisting of;

4 - Vernier caliper (150 mm)
4 - Vernier caliper (300 mm)
3 - Vernier caliper (600 mm)
2 - Outside micrometer
1 - Vernier height gauge
1 - Combination square
4 - Steel rule (300 mm)
4 - Steel rule (600 mm)
2 - Thickness gauge (0.05 - 1.0 mm)
2 - Thickness gauge (0.0015 - 0.025 mm)
3 - Divider (200 mm)
3 - Outside caliper
2 - Inside caliper
1 - Dial gauge
1 - Magnetic stand
1 - Precision square (75 x 100)
1 - Precision square (100 x 150)
1 - Bearing checker
1 - Rotary meter

10 - Driver
5 - Plier
2 - Spanner sets (spanner each 6)
1 - Socket wrench set (13 wrenches)
3 - Pipe wrench
5 - Monkey wrench
2 - Offset wrench
10 - Hexagonal wrench
10 - Hammer
2 - Punch
5 - Chisel
2 - Scraper
2 - Tool box
1 - Lot woodworking tools: Routers/trimmers, belt sander, circular saw, miter saw, jointer/planer, jig saw, wood lathe machine

FIG. 6-2 GENERAL LAYOUT

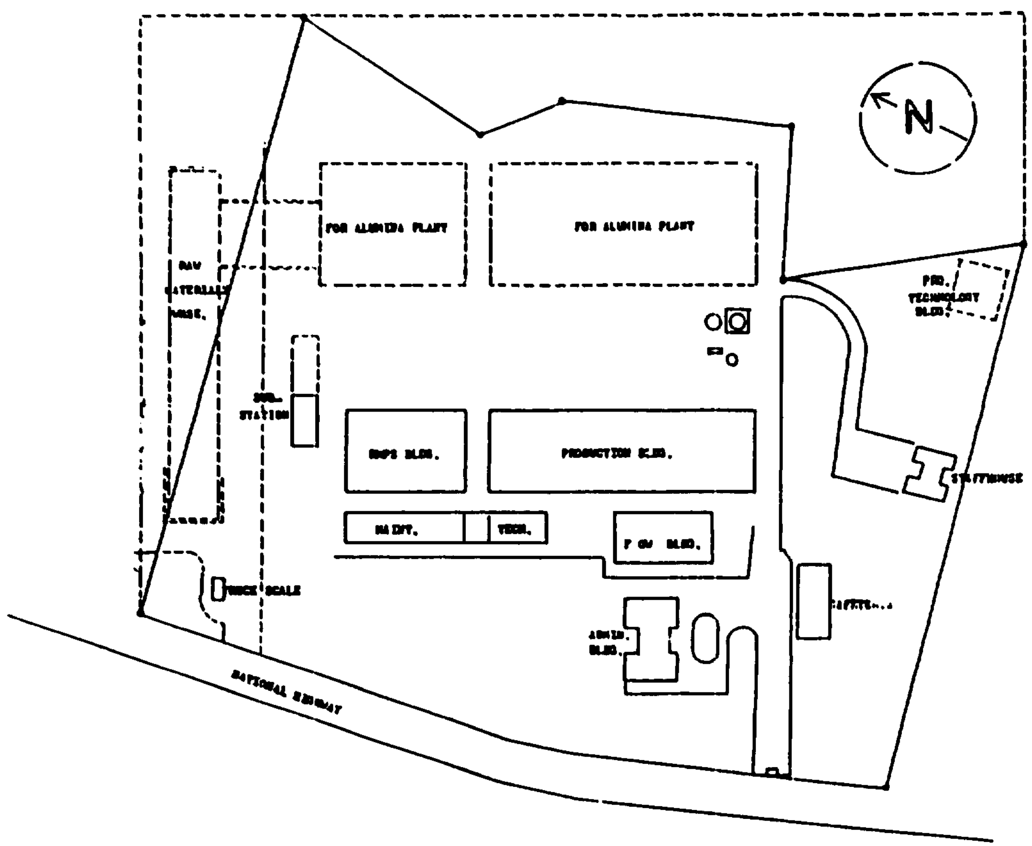
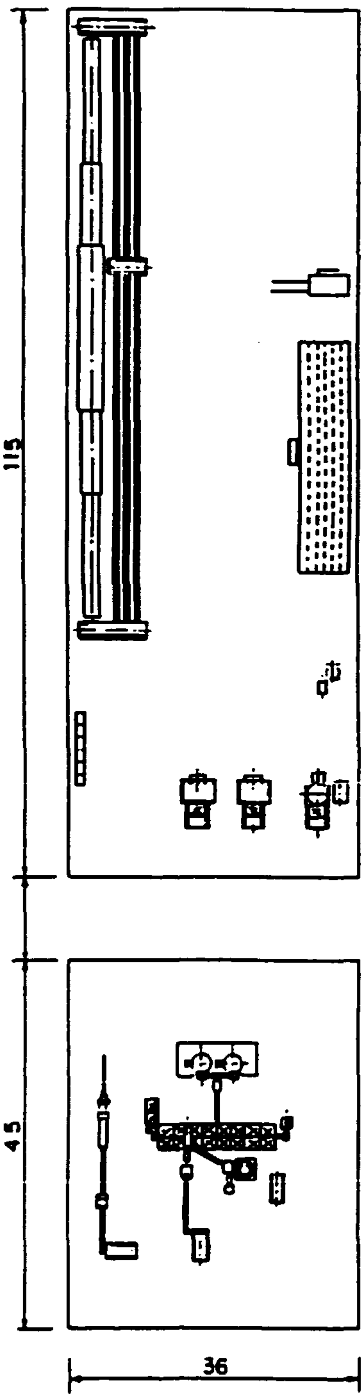


FIG. 6-3 MACHINE LAYOUT



LIST 6-3

LOCAL

LIST OF MACHINERY AND MATERIALS

1. BELT CONVEYOR : 1 lot

Type : Roller carrier type

Capacity : 10 t/hr.

Consisting of;

1 - 350 W x 12,000 L mm with 1.5 kw motor

1 - 350 W x 10,000 L mm with 1.5 kw motor

2 - 350 W x 7,000 L mm with 0.75 kw motor

3 - 350 W x 3,500 L mm with 0.4 kw motor

1 - 600 W x 3,000 L mm with 1.5 kw motor

2. SKIP HOIST : 1 lot

Type : Automatic discharging type

Capacity : 500 kg/batch

Consisting of;

2 - 30 M length with 7.5 kw motor for raw materials transportation

3 - 4 M height with 3.5 kw motor

1 - 2 M height with 2.3 kw motor

3. HOT AIR GENERATOR : 1 set

Type : Diesel oil fired type

Calorific value : 600,000 kcal/hr.

4. HOPPER : 1 lot

2 - 6 M3 capacity with support
30 - 10 M3 capacity with support

5. BAR SCREEN : 2 sets

6. TRANSPORTATION EQUIPMENT : 1 lot

2 - Shovel loader (0.7 M3)
2 - Forklift truck (2 tons)
10 - Hand cart (300 kg)
300 - Drying cart

7. WEIGHING BALANCE : 1 lot

1 - 1,000 kg
1 - 500 kg

8. STEEL STRUCTURE : 1 lot

1 - Stairway for storage hopper
4 - Stairway for mixer
3 - Stairway for press
1 lot - Duct, chamber and chute
1 lot - Safety cover for machinery
1 - Chimney

9. ELECTRIC SUPPLY SYSTEM : 1 unit

1 - Wiring

1 - Pipe and fittings

1 - Lighting apparatus

10. OTHER MATERIALS : 1 lot

1 lot - Wooden pallet

1 lot - Steel pallet

1 lot - Asbestos slate

1 lot - Common brick

1 lot - Cement

1 lot - Lime

1 lot - Sand

1 lot - Piping materials for fuel and water

6.4.2 The cost of machinery and equipment is as follows

SCHEDULE 6-3

Unit ₱1,000

| Equipment | | | |
|---|---|---|---|
| **Description** | **Foreign** | **Local** | **Total** |
| 1. Production Equipment | 179,949 | 74,530 | 254,479 |
| Crushing section | (C & F) | | |
| Mixing & kneading section | | | |
| Forming section | | | |
| Drying & firing section | | | |
| 2. Auxiliary Equipment | 24,923 | 3,430 | 28,353 |
| Electric supply | (C & F) | | |
| Maintenance work shop | | | |
| 3. Vehicle | ------ | 1,400 | 1,400 |

- Continued to next page -

| | | | |
|---|---|---|---|
| 4. Transportation for import equipment | ------ | 616 | 616 |
| Equipment Total | 204,863 | 79,976 | 284,848 |
| 5. Primary stock for one year of spare and wear parts | 4,577 | 224 | 4,801 |
| Total | 209,440 | 80,200 | 289,649 |

## 6.5 Civil Engineering Work

### 6.5.1 Land Preparation

The area to be newly purchased lies in a hilly locality. The site is to be cleared and graded, and cut and fill quantities are assumed to be roughly in balance. The finished elevation of the graded site is higher by about 3M in the highest portion than the existing public road. The greater part is to be excavated, so the average height will be about 2M in average. The elevation of the factory shop floor of a new plant becomes higher by about 1.5M than that of the existing plant.

Cut and fill are assumed to be in balance, including fill for the road leading to the existing plant from public road. Filled areas are to be compacted by tyre roller.

### 6.5.2 Road Construction at the Site

The on-site road is paved and have the width of 7m.

Paved road area: 4,410 m2

Payment specifications

| | |
|---|---|
| Foundation works: | Finishing thickness 10 cm by crushed stone |
| Rolling compaction: | By tyre roller |
| Pavement: | Surface thickness 10 cm by concrete |

### 6.5.3 Drainage Works

Concrete-made drainage ditches of 80 cm width and 60 cm depth are to be laid for factory buildings and pavement road.

Total length of drainage ditch : 630 m

### 6.5.4 Stone Masonry Works for Retaining (Riprap)

A difference in elevation of about 10m exists between the raw materials storage area and existing plant site, so that stone masonry works are needed, for which stone 30 cm2 in average is to be used with concrete for joints.

## 6.6 Building Construction Works

The details of buildings to be newly constructed is as described hereunder. The buildings are to be locally constructed in accordance with the regulations of the Philippines.

### 6.6.1 Material Preparation Factory

The factory is to do crushing, mixing and kneading of raw materials, work which generates dust. In order to prevent dust from spreading, by collecting it effectively, the factory is planned to be constructed as an independent building.

Dimension of buildings : 36 m x 45 m
Eaves height 6 m

Structure and specification

| | | |
|---|---|---|
| Structure | : | Steel frame |
| Roof and wall | : | Corrugated slate sheet |
| Floor | : | Concrete floor capable of sustaining a 2 ton shovel loader |
| Door | : | Steel-made suspension type<br>4 each of 6 m x 4 m<br>2 each of 4 m x 4 m |

Other specifications are to be similar to that of the existing plant.

### 6.6.2 Forming and Firing Factory

The factory always carries out work under high temperature, where special importance is given to ventilation.

Dimensions of building : 36 m x 115 m
Eaves height 6 m

Structure and specifications
Similar to those of material preparation factory, except for doors.

Doors : Steel-made suspension type
4 each of 6 m x 4 m
4 each of 4 m x 4 m
2 each of 3 m x 2 m

### 6.6.3 Raw Materials Storage House

The building is for storage of raw materials and for their crushing facilities.

Dimension of building : 10 m x 100 m
Eaves height 5 m

Structure and specification
The building is to be one-side full opening type
Structure : Steel frame
Roof : Corrugated slate sheet
Wall : Concrete block, mortar finish
Other specifications are similar to those of the existing factory.

### 6.6.4 Electric Substation

The building of a new plant is of expansion of that of the existing plant.
The specification is to be similar to that of the existing plant.

### 6.6.5 Raw Materials Loading Area

The building is for a skip hoist to transport raw materials from the raw materials storage house to the material preparation factory. Accordingly, the structure may as well be a simple one, of light-weight steel frame and slate. Two buildings with the dimension of 2 m x 50 m each are planned.

### 6.6.6 Finished-Products Warehouse

The structure and specifications are similar to those of the existing warehouse.

Dimension of building : 36 m x 40 m

### 6.6.7 Lighting

The production facilities to be erected in each building need concentrated lighting. Accordingly, the integrated lighting in building is planned on the basis of 80 lux.

## 6.7 Erection

6.7.1 The machinery and equipment are to be erected and installed by the company under the supervision of foreign engineer.

6.7.2 Erection Cost

Erection cost was calculated on the basis as follows;

| | |
|---|---|
| Erection cost of machinery and equipment : | ₱ 14 /kg |
| Steel cutting treatment and erection cost : | ₱ 19 /kg |
| Electrical work cost : | 50 % of material cost |
| Piping cost : | ₱25 /kg |
| Foundation cost : | ₱1,700/m3 |

## 6.8 Incidental Facilities

Incidental facilities are to be procured in the Philippines and erection and installation works are to be carried out by the company.

6.8.1 Electric Supply Facilities

The existing electric substation can be used, as it has unused capacity for an electric source 3 phase motor. Therefore, only electric wiring needs to be additionally supplied. For electricity for lighting, the existing transformer has no surplus capacity. Therefore, a transformer and electric supply facilities are additionally needed.

### 6.8.2 Maintenance

The existing maintenance work shop can be commonly used but machinery for maintenance will be additionally needed because of the increased maintenance requirement.

## 6.9 Cost Estimation

Civil engineering works, building construction works and erection cost are as follows;

SCHEDULE 6-4

UnitP=1,000

| No. | Q'ty | Unit | Description | Unit Cost | Foreign | Local | Total |
|---|---|---|---|---|---|---|---|
| CIVIL WORKS | | | | | | | |
| 1. Civil Engineering Works | | | | | | | |
| | 4,000 | M2 | Land Preparation for New Area | 185 | ---- | 740 | 740 |

- Continued to next page -

| | | | | | | |
|---|---|---|---|---|---|---|
| 10,000 | M2 | Land Preparation for Existing Area | 135 | ---- | 1,350 | 1,350 |
| 4,410 | M2 | Road | 550 | ---- | 2,425.5 | 2,425.5 |
| 630 | M | Drainage | 340 | ---- | 214.2 | 214.2 |
| 800 | M2 | Retaining | 1,100 | ---- | 880 | 880 |
| Sub Total | | | | | 5,609.7 | 5,609.7 |

2. <u>Building Construction Works</u>

| | | | | | |
|---|---|---|---|---|---|
| 1,620 | M2 | Material Preparation | ---- | 6,804 | 6,804 |
| 4,140 | M2 | Forming & Firing | ---- | 17,388 | 17,388 |
| 1,000 | M2 | Raw Materials Storage | ---- | 3,900 | 3,900 |
| 25 | M2 | Electrical Sub Station | ---- | 90 | 90 |
| 200 | M2 | Raw Materials Loading | ---- | 720 | 720 |
| 1,440 | M2 | Warehouse | ---- | 6,048 | 6,048 |
| Sub Total | | | | 34,950 | 34,950 |

3. Erection Works

| | | | | | | |
|---|---|---|---|---|---|---|
| 180 | M3 | Foundation | 1,700 | ---- | 306 | 306 |
| 880 | T | Erection | 14,000 | ---- | 12,320 | 12,320 |
| Electrical Work | | | ---- | ---- | 930 | 930 |
| 12 | T | Piping | 25,000 | ---- | 400 | 400 |
| Erection Works Total | | | | | 13,956 | 13,956 |
| Total | | | | | 54,515.7 | 54,515.7 |

# VII. PLANT ORGANIZATION AND OVERHEAD COSTS

## 7.1 General

The project is an expansion of the existing plant, which make it different from a new project in the following points.

### 7.1.1 Organization, Indirect Facilities and Manning

Addition of alumina refractories production department into the existing organization as a direct production line can be readily accomplished.
However, the maintenance department needs to be provided with certain facilities that are now lacking and add personnel. In addition, the technical department needs to add personnel for quality control.

### 7.1.2 Overhead Cost

As an addition to the existing organization of RCP, the project should be expected to bear a part of general corporate overhead cost.

## 7.2 Organization

The present organization of RCP is shown in Fig. 8-1. The administrative management of RCP makes use of office automation equipment.
The situation is such that there would be no need for addition of personnel if the project is realized.
In the marketing department also there would be no need for an increase of personnel, because alumina refractories would be sold to the same end-user as that of basic refractories at present.

## 7.3 Overhead Costs

Overhead costs are divided into the following.

### 7.3.1 Newly necessary overhead

A production section for alumina refractories is to be newly established for alumina refractories production. Thus, overhead cost of the production section itself arises. Although the overhead cost is established on the basis of the existing production section (basic refractories), it is planned that 2 persons, an engineer and/or technician, are to get training in a foreign country for approximately 2 weeks every year during the first 3 years after the start of operation of the project.

### 7.3.2 Burden on the existing organization

A part of the overhead cost of the existing organization should be borne by the new activity. For the allocation of the overhead cost, there are many methods, e.g., production tonnage ratio, sales volume ratio, value added ratio, etc.
In case of a new project, there is frequently a burden for depreciation and bank interest, that works to lower price competitiveness with imports.
From the viewpoint of the existing plant, if a part of overhead cost is borne by the new project, an advantage is obtained. In view of situation stated above, the allocation of overhead cost is determined to be kept low.

(1) In the maintenance department, there would be an increase of 4 persons, which correspond to 8.7% of the present workforce of 46 persons.
This addition of personnel itself increases overhead cost. Nevertheless, the burden of the project is planned as 30% of the total cost.

(2) In the technical department, there would be an increase of 4 persons beyond the present level of 24 persons. Nevertheless, cost allocation rate is planned as 30%.

(3) In each other departments, cost allocation is planned to be 20%.

7.3.3 Overhead Costs

Overhead costs are divided into the following.

SCHEDULE 7-1

Unit₱1,000

| | |
|---|---|
| **Factory Overhead** | |
| **Production Dept. (Alumina)** | |
| Maintenance | 5 |
| Materials | 22 |
| Communication | 9 |
| Documentation | 3 |
| Training | 2 |
| Travel | 10 |
| Overseas training | 116 |
| Sub Total | 167 |
| Technical Dept. | 622 |
| Logistic Dept. | 343 |
| Factory Overhead Total | 1,132 |
| **Administrative Overhead** | |
| Marketing Dept. | 852 |
| Administration Dept. | 840 |
| Administrative Overhead Total | 1,692 |

| | |
|---|---|
| Maintenance overhead | 1,120 |
| Overhead Total | 3,944 |

# VIII. MANPOWER

## 8.1 General

Most of the personnel requirement in the indirect departments will be covered by existing RCP personnel.
Product quality required for the project is different from that of the present production line, but the machinery and equipment operation technics are nearly the same. Thus, by transferring employees who are already well trained in the existing plant, the manpower requirement can be easily met.

## 8.2 Organization

The organization of the present plant is shown in Fig. 8-1 and the proposed organization for the project in Fig. 8-2.

### 8.2.1 Production Department

The manager of the existing production department is in charge of the production of basic refractories. For the new plant, a production manager is to be newly assigned as shown in Fig. 8-2.

### 8.2.2 Technical Department

Quality control, and products research and development, can be carried out in the existing organization, but four new assistants are to be employed.

### 8.2.3 Maintenance Department

The maintenance shop in charge of plant facilities can also take care of the new plant, but four persons must be employed.

### 8.2.4 Others

In accordance with operation of the new plant, office work including accounting will increase, so that one accountant and one office assistant are to be employed.

## 8.3 Availability of Labor

Skilled labor for the new plant is to be transferred from the existing RCP plant, and replaced by reassignment and routine promotion. Newly required unskilled laborers are to be newly employed. Iligan city, where the plant is to be, is a factory district, but the surrounding area has less industry. Thus, employment of unskilled labor will be no problem at all.

Fig. 8-1

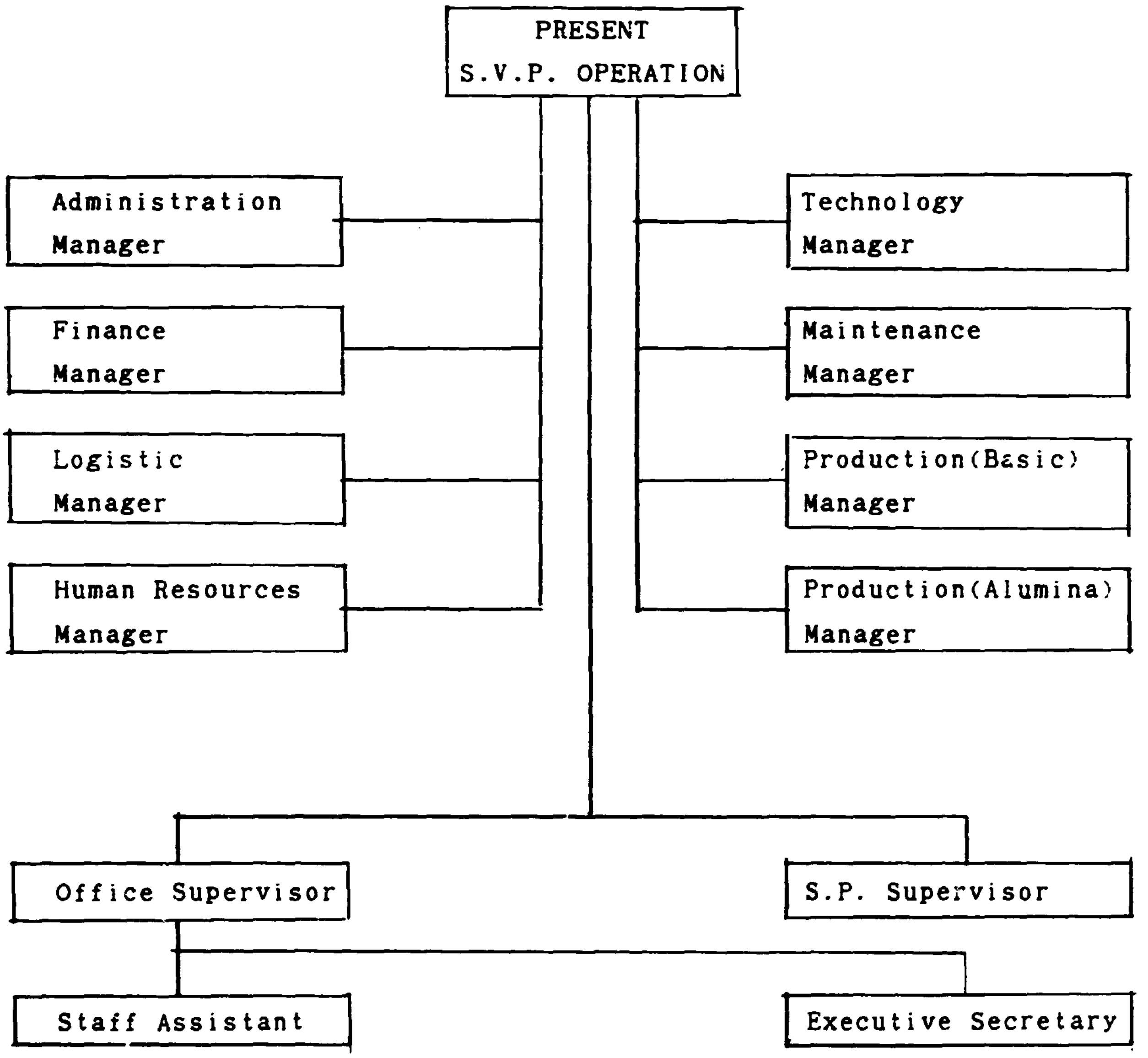
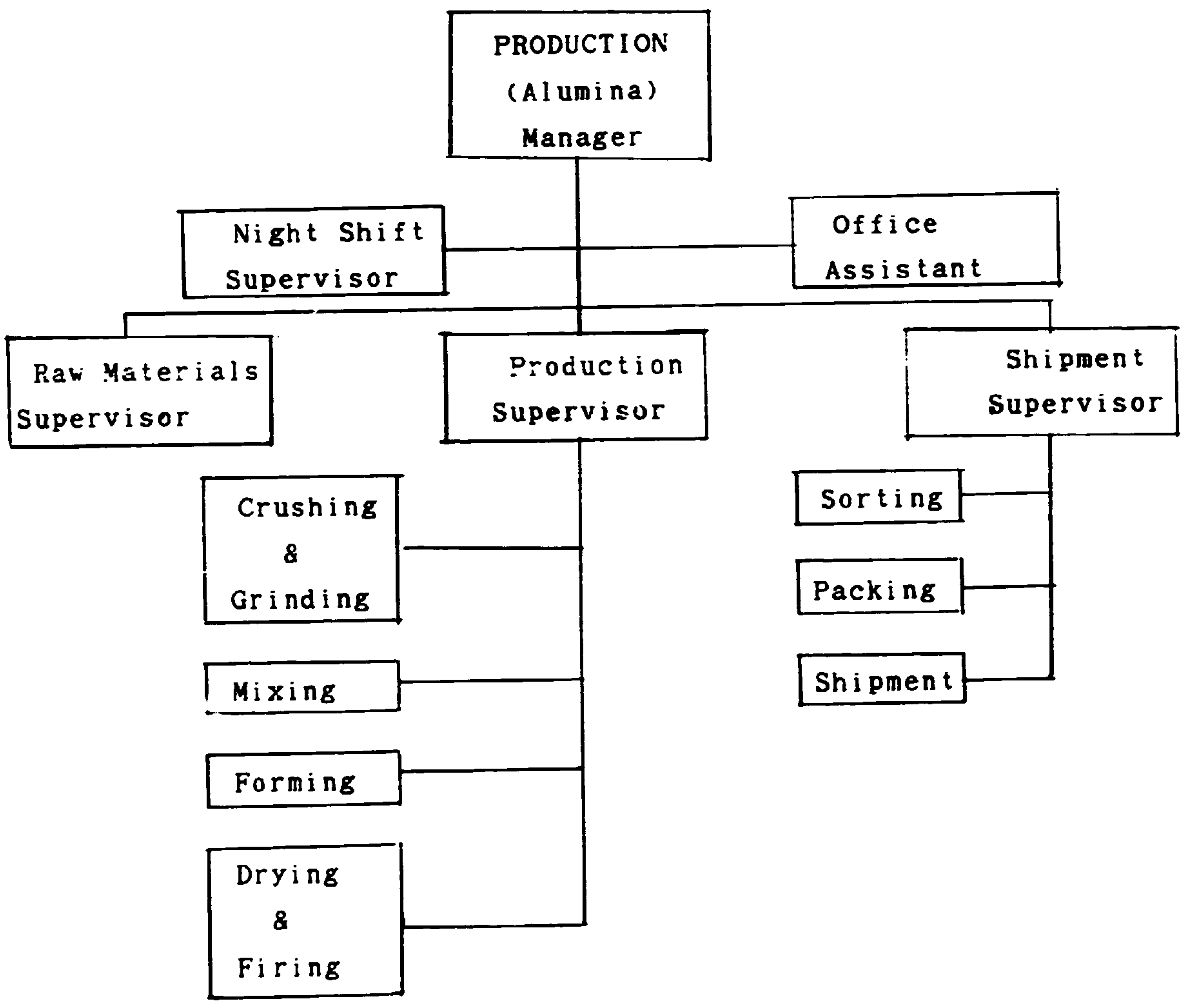

PRESENT
S.V.P. OPERATION
Administration Manager
Finance Manager
Logistic Manager
Human Resources Manager
Technology Manager
Maintenance Manager
Production(Basic) Manager
Production(Alumina) Manager
Office Supervisor
S.P. Supervisor
Staff Assistant
Executive Secretary

Fig. 8-2

PROPOSED ORGANIZATION
FOR PROJECT
IMPLEMENTATION



## 8.4 Working Days and Utilization of Capacity

### 8.4.1 Working Days

SCHEDULE 8-1

| Section | Working Days per Year | Shifts per Day | Working Hour per Shift |
|---|---|---|---|
| 1) Crushing & Grinding | 300 | 1 | 8 |
| 2) Mixing & Kneading | 300 | 2 | 8 |
| 3) Forming | 300 | 2 | 8 |
| 4) Drying & Firing | 365 | 3 | 8 |
| 5) Chamotto Making | 300 | 1 | 8 |
| 6) Maintenance | 300 | 1 | 8 |
| 7) Laboratory | 300 | 1 | 8 |

8.4.2 Utilization of Capacity

Utilization of capacity after the start of plant operation is anticipated to be as follows;

1st year : 80%

2nd year and after : 100%

## 8.5 Required Personnel

The number of personnel and personnel cost are as follows.

SCHEDULE 8-2

Unit ₱1,000

| No. | Description | Monthly Salary | Total |
|---|---|---|---|
| 1 | Production manager | 13.0 | 156.0 |
| 4 | Supervisor | 5.4 | 259.2 |
| 3 | Office assistant | 2.2 | 79.2 |
| 4 | Technical | 3.0 | 144.0 |
| 4 | Maintenance | 3.0 | 144.0 |

-- Continued to next page --

| | | | |
|---|---|---|---|
| 24 | Skilled worker<br>Crushing & grinding (2)<br>Mixing (2)<br>Forming (6)<br>Drying & Firing (9)<br>Sorting (5) | 2.8 | 806.4 |
| 14 | Unskilled worker<br>Forming (2)<br>Drying & Firing (6)<br>Packing (4)<br>Shipment (2) | 2.2 | 369.6 |
| 54 | Sub Total | | 1,958.4 |
| | Bonus & welfare allowance (46%) | | 900.9 |
| | Total | | 2,859.3 |

# IX. IMPLEMENTATION SCHEDULE

## 9.1 General

Because the project is for expansion of an existing plant, documentation and procedures to get approval from the government will not be complicated.
Further, because this project represents an upgrading and diversification of the production and marketing of a going concern, and the company has good knowledge of market conditions, trend of import products, etc., implementation can be expected to proceed as smoothly as planned.
The timing of implementation has been assumed as per the description below.

### 9.1.1 Study for project plan

Completed by the end of September, 1991.

### 9.1.2 Completion of financial arrangements by RCP.

Completed by the end of December, 1992.

### 9.1.3 Ordering of machinery and equipment and selection of technical partner

Completed by the end of December, 1991.

9.1.4 Fubrication of machinery and equipment, delivery, installation and test-run

Completed by the end of December, 1992.

9.1.5 Start of Operation

To be ready by the end of January, 1993.

## 9.2 Purchase of Land and Machinery & Equipment

### 9.2.1 Purchase of land

The plant site of the project has already been determined on account of the project's being an expansion of an existing plant. The land to be newly purchased lies adjacent to the existing plant, and is about 4,000 square meters. The land is located behind the existing plant, facing a main national road, and contains a forest of palm trees. The owner of the land is known. No other potential buyers exist and in view from the friendly relation created so far by the company with the owner the purchase procedure will be relatively easy.

### 9.2.2 Purchase of machinery and equipment

RCP is experienced in the purchase of machinery and equipment of the same kind as that of the project and is well acquainted with the use and maintenance of machinery and equipment. Thus, RCP will not need tender documents but can directly enter into negotiations for the purchase of machinery and equipment from prominent makers.

## 9.3 Pre-operation Cost

### 9.3.1 Pre-construction cost

(1) Office expenses

| | |
|---|---|
| Estimated as 10% of semi-annual office expenses in the existing plant: | ₱40,000 |

(2) Full-time staff, supervisory class, for 6 months

| | | |
|---|---|---|
| Salary | ₱3,000 x 6 = | ₱18,000 |
| Bonus, etc. | (46%) | ₱8,280 |
| Sub Total | | ₱26,280 |

### 9.3.2 Site Preparation, Construction and Related Expenses

It is desired that services for civil works, installation of machinery and equipment, etc. should be purchased separately from specialized companies known to be capable of responsible work.
In the installation of imported machinery and equipment, it is assumed that a supervising engineer will be despatched by the foreign supplier.
During implementation of the construction work, the present company staff will cooperate with the work.
Thus, the expenses during the term of construction are estimated as follows:

(1) Office expenses ₱180,000

(2) Personnel cost

Full-time staff, 2 persons, assistant, 1 person, all for 1 year.

| | | |
|---|---|---|
| Salary | ₱3,000 x 2 x 12 = | ₱72,000 |
| Salary | ₱2,200 x 1 x 12 = | ₱26,400 |
| Sub Total | | ₱98,400 |
| Bonus, etc. (46%) | | ₱45,300 |
| Total | | ₱143,700 |

### 9.3.3 Training Expenses

Pre-training in the Philippines isn't needed, but pre-training in the foreign country supplying the equipment is needed. The expenses are estimated as follows:

| | | |
|---|---|---|
| No. of trainees | : | 3 |
| Training term | : | 3 months (total 9 man-months) |
| Staying expenses | : | ₱460,000 |
| Salary | : | ₱39,000 |
| Air-ticket | : | ₱81,000 |
| Total | | ₱580,000 |

### 9.3.4 Test-run Cost

The production technics of the project have already been mastered by present workers. Accordingly, full operation at 100% of capacity is possible from the initial stage of operation. However in due consideration of trial use-test, etc. of the products by the end-users, sales volume for the first year.
The as assumed as 80% of estimated target sales volume products manufactured during the test-run period are supposed to be almost salable. Thus, for test-run cost, approximately 5% of total production quantity was estimated as raw material cost to be consumed during the test-run.

The amount is as follows:

| | |
|---|---|
| Foreign currency portion | ₱3,799,000 |
| Local currency portion | ₱ 511,000 |
| Total | ₱4,310,000 |

9.3.5 Interest during construction

The annual interest during construction is estimated as 21% on the basis of repayment schedule for the first year (Schedule 10-7/1, 7/2). The total amount is ₱27,300,000.

9.3.6 The cost prior to operation is as follows:

SCHEDULE 9-1

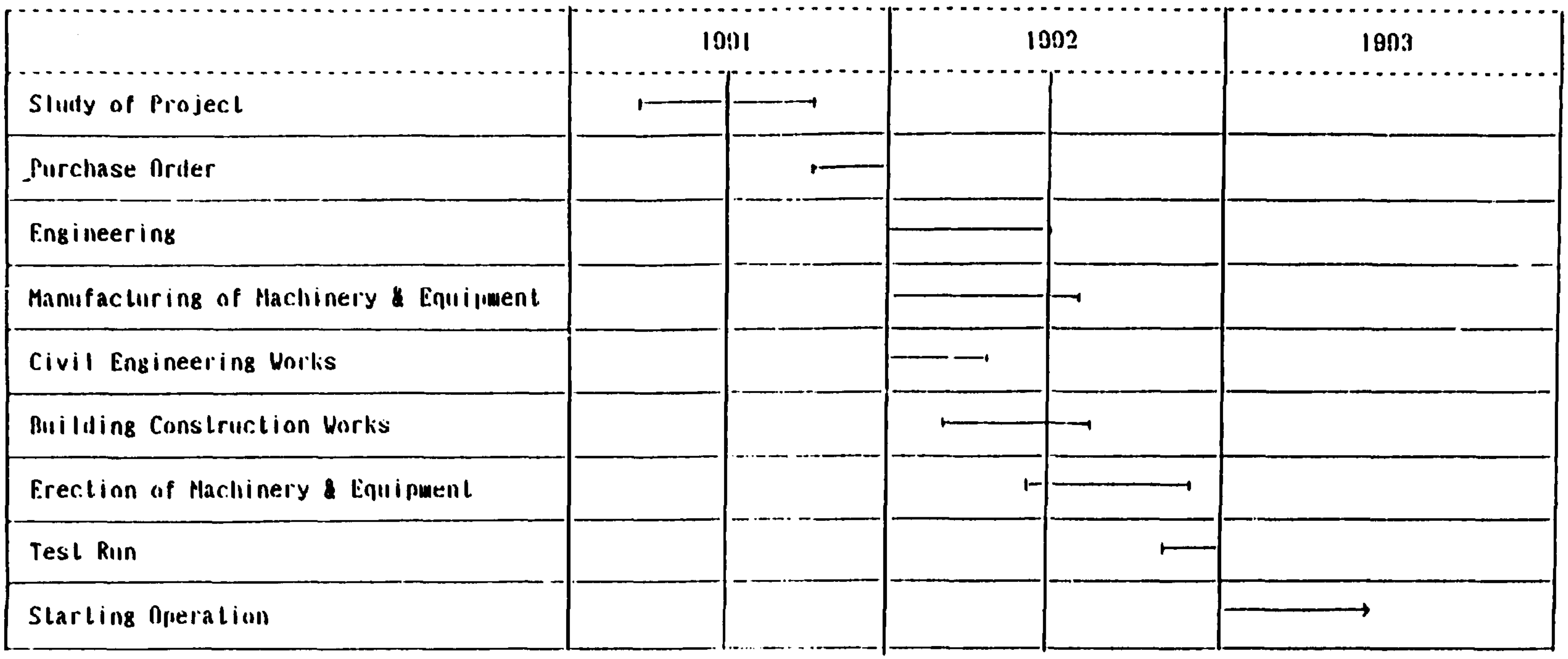
Unit ₱1,000

| Pre-operation Cost | Foreign | Local | Total |
|---|---|---|---|
| Contract and its relating expense | --- | 26 | 26 |
| Construction and related expense | --- | 144 | 144 |
| Training expense | 541 | 39 | 580 |
| Test-run cost | 3,799 | 511 | 4,310 |
| Interest during-construction | --- | 27,300 | 27,300 |
| Miscellaneous | 60 | 280 | 340 |
| Total | 4,400 | 28,300 | 32,700 |

## 9.4 Implementation Schedule

See Schedule 9-2.

## SCHEDULE 9-2 IMPLEMENTATION SCHEDULE



# X. FINANCIAL AND ECONOMIC EVALUATION

## 10.1 General

Financial and economic evaluation is carried out under the premises stated hereunder.

### 10.1.1 Plant construction

(1) Purchase order of the plant : End of December 1991

(2) Completion of the plant : End of December 1992

### 10.1.2 Plant operation

(1) Start of operation : January 1993

(2) Utilization of capacity

| | | |
|---|---|---|
| 1st year | : | 80% |
| 2nd year and after | : | 100% |

### 10.1.3 Foreign exchange rate : US$1.00 = ₱22.8 = ¥148

10.1.4 Project lifetime

The project is evaluated over a period of 11 years, the first year being the construction period followed by 10 years of production.

## 10.2 Plant Construction Cost

10.2.1 Land : SCHEDULE 5-1

Purchase price of the new area was estimated as ₱2,290,000.

10.2.2 Machinery & Equipment (excluding spare parts) : SCHEDULE 6-3

The purchase price of machinery and equipment was estimated as ₱283,448,000 on the assumption that import duties would be exempted under the tax incentive given to pioneer industry.

10.2.3 Vehicles : SCHEDULE 6-3

The vehicle is to be imported. In consideration of service receivable after purchase, purchase from a local agent is planned. The price was estimated as ₱1,440,000.

### 10.2.4 Civil Works : SCHEDULE 6-4

Civil engineering works and building construction works in Schedule 6 - 4 were taken as the object of civil works. The total amount was estimated as ₱40,560,000. Erection works are shown separately.

### 10.2.5 Erection Works : SCHEDULE 6-4

Erection works mean provision of the foundation, erection, electrical and piping works of machinery and equipment. The total amount was estimated as ₱13,956,000.

### 10.2.6 Technical Fee : SCHEDULE 6-1

Technical fee consists of an engineering fee (₱1,540,000) for the machinery and equipment of local supply, engineering fee (₱700,000) for building, and a supervising fee (₱7,893,000) for the engineer from a foreign country. The total amount was estimated as ₱10,133,000.

### 10.2.7 Contingencies

For the contingencies, approximately 10% of the foreign currency portion and approximately 15% of local current portion were estimated as total ₱43,213,000.

SCHEDULE 10-1

Unit ₱1,000

Plant Construction Cost

| Description | Foreign | Local | Total |
|---|---|---|---|
| (1) Land | ----- | 2,290 | 2,290 |
| (2) Machinery & Equipment | 204,872 | 78,576 | 283,448 |
| (3) Vehicle | ----- | 1,400 | 1,400 |
| (4) Civil Work | ----- | 40,560 | 40,560 |
| (5) Erection Work | ----- | 13,956 | 13,956 |
| (6) Technical Fee | 9,063 | 1,070 | 10,133 |
| (7) Contingencies | 21,065 | 22,148 | 43,213 |
| Total | 235,000 | 160,000 | 395,000 |

## 10.3 Annual Production Cost (SCHEDULE 10-2)

### 10.3.1 Raw Materials : SCHEDULE 4-1

The cost of raw materials is estimated ₱86,274,000 in 3rd year and after and ₱73,330,000 in the 2nd year although use of capacity at that time is 80%.

10.3.2 Utilities : SCHEDULE 4-2

The cost of utilities is estimated as ₱9,374,000 the same as that of full operation inclusive of loss arising from test-run and products loss.

10.3.3 Personnel Cost : SCHEDULE 8-2

Personnel cost is estimated as ₱2,859,000, the same as that of full operation since training is needed in the 2nd year.

10.3.4 Spare Parts : SCHEDULE 6-3

| | | |
|---|---|---|
| 1st year | : | 30% of Primary Stock Spare Parts (₱1,440,000) |
| 2nd year | : | 50% of Primary Stock Spare Parts (₱2,401,000) |
| 3rd year and after | : | 80% of Primary Stock Spare Parts (₱3,841,000) |

10.3.5 Maintenance : SCHEDULE 7-1

Spare parts inclusive of those for unexpected damages are to be stocked. From experience in the operation of this kind of plant, Approximately 80% of the stocked spare parts are merely used. In the 1st year and the 2nd year after the start of operation of a new plant, wear and damages of machinery and equipment are not much to be 30% and 50% respectively. Thus, maintenance cost is estimated as ₱1,120,000 representing the allocation of 30% of overhead to the existing department.

### 10.3.6 Technical Fee

| | | |
|---|---|---|
| Royalty | : | SCHEDULE 6-2 |

Royalty is estimated as ₱3,080,000 for the initial royalty in addition to the amount cited below for the 3rd year and after.

Supervision for operation
2 persons for 12 man/months

Supervising fee is estimated in the 2nd year as follows :

| | |
|---|---|
| Salary for 12 man/months | : ₱2,769,000 |
| Air fair for 2 persons | : ₱ 47,000 |
| Staying expense | : ₱ 91,000 |
| Total | ₱2,907,000 |

The annual technical fee is as follows:

| | | |
|---|---|---|
| 2nd year | : | Initial royalty (₱3,080,000) plus<br>Supervising fee (₱2,907,000) |
| 3-4th year | : | Running royalty (2% of sales price)<br>₱255,326,000 x 0.02 = ₱5,106,520 |
| 5-7th year | : | Running royalty (3.5% of sales price)<br>₱255,326,000 x 0.035 = ₱8,936,410 |

10.3.7 Factory Overhead : SCHEDULE 7-1

The production department newly installed for the operation of the project will incur overhead cost. For technology and logistics departments, the present existing organization can be used as it is.

Thus, burden for 30% in technology department and 20% in the logistics department were estimated.

The amounts stated below have been estimated

| | | |
|---|---|---|
| Production Dept | : | ₱167,000 |
| Technology | : | ₱622,000 |
| Logistics | : | ₱343,000 |
| Total overhead | | ₱1,132,000 |

10.3.8 Administrative Overhead : SCHEDULE 7-1

The present existing organization can be used as it is. Thus, an allocation of for 20% of overhead in each department was estimated.

The amounts stated below have been estimated.

| | | |
|---|---|---|
| Marketing | : | ₱852,000 |
| Administration | : | ₱840,000 |
| Total | | ₱1,692,000 |

### 10.3.9 Sales & Distribution Cost : SCHEDULE 3-31

Sales cost was estimated as ₱300 per product ton and distribution cost as ₱500 per product ton.

| | | |
|---|---|---|
| Sales cost | ₱2,050,000 | ₱2,562,000 |
| Distribution cost | ₱3,416,000 | ₱4,270,000 |
| Total | ₱5,466,000 | ₱6,832,000 |

### 10.3.10 Depreciation

Buildings (civil works) : 20 years ₱2,063,000

Building cost is inclusive of engineering fee ₱700,000

(₱40,560,000 + ₱700,000) x 0.05 = ₱2,063,000

Machinery & Equipment : 10 years ₱30,684,000

Machinery and equipment cost is inclusive of erection cost and engineering fee

(₱283,448,000+₱13,956,000+₱9,433,000) x 0.1 = ₱30,683,700

Vehicle : 7 years ₱200,000

₱1,400,000 x 1/7 = ₱200,000

Others : 10 years ₱4,321,000

₱43,213,000 x 0.1 = ₱4,321,300

---

Total ₱37,268,000

Land cost ₱2,290,000 isn't depreciated but reclaimed in the 11th year of cash flow.

The salvage value of each facility is 0% of the initial price on and after time.

10.3.11 Interest : 21% per year

A long-term loan inclusive of the foreign currency portion was estimated as if it was a loan from a commercial bank. Accordingly, interest was estimated as 21% indiscriminately.

10.3.12 Income tax : 35% of gross profit

In case that as deficit results in the income statement, the deficit is not carried over to the next fiscal end.

## 10.4 Project Financing

### 10.4.1 Working Capital (SCHEDULE 10-3)

(a) Accounts receivable : 30 days for production cost minus depreciation and interest.

(b) Inventory

| | | |
|---|---|---|
| Raw materials | : | 60 days |
| Spare parts | : | 360 days |
| Work in progress | : | 10 days |
| Finished products | : | 30 days |

(c) Cash in hand : 30 days

The calculation of "cash in hand" is based on the amount after deduction of raw materials cost, utilities cost interest and depreciation from production cost.

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

M.D and C.T mean the following.

M.D : Minimum days of coverage
C.T : Coefficient of turn over

The sum of working capital is estimated ₱41,000,000.

10.4.2 Repayment Schedule and Interest (SCHEDULES 10-4 & 10-7)

(a) Repayment

Grace period : 2 years
Repayment period : 6 years

(b) Interest : 21 % per year

The long-term loan is estimated as ₱318,000,000 equivalent to approximately 73% of total investment by which complete repayment becomes possible as per the payment schedule without a fund shortage during the payment period.

The debt/service ratio is shown hereunder.

| Year | Debt/Service Ratio |
|---|---|
| 1 | ----- |
| 2 | 0.48 |
| 3 | 0.08 |
| 4 | 0.17 |
| 5 | 0.27 |
| 6 | 0.43 |
| 7 | 0.65 |
| 8 | 1.06 |

The above figures are derived from the formula.

$$\frac{\text{Annual net cashflow}}{\text{Annual loan repayment and Interest payment}}$$

The debt/service ratio is extremely low, which is caused by the low capital ratio and high bank interest. Accordingly, it is possible to raise the debt/service ratio by raising the capital ratio. However, the project can have high profitability without a high level of debt even though the capital ratio is low.

RCP, a going concern, will invest its own funds in this project. Meanwhile, in so far as equity is concerned, the higher the ratio, the better it is in view from the payability of the enterprise for the present majority shareholders, NSC and NDC.

The privatization of national enterprises in the Philippines has been actively promoted by the Government under the privatization policy. In accordance with this, RCP's privatization will be worked out in the near future and present miority share-holders will acquire the share owned by NSC and NDC and increase the capital for the sake of project. The entire ratio of the capital increase is planned to be reduced as much as possible.

### 10.4.3 Total Investment

SCHEDULE 10-5

| Category | Foreign | Local | Total |
|---|---|---|---|
| Fixed Investment Cost | | | |
| from Schedule 10-1 | 235,000 | 160,000 | 395,000 |
| Pre-operation Cost | | | |
| from Schedule 9-1 | 4,400 | 28,300 | 32,700 |
| Initial Investment | 239,400 | 188,300 | 427,700 |
| Working Capital | | | |
| from Schedule 10-3 | 15,000 | 21,000 | 36,000 |
| Total Investment | 254,400 | 209,300 | 463,700 |

### 10.4.4 Sources of Finance

If the foreign currency portion can be financed in foreign currency by supplier's credit or bank, the interest cost goes down. In case that the rate of foreign exchange fluctuateds, however, it could exert a destabilizing influence on the business plan.
Therefore, the finance was planned as a bank loan in Pesos for the total amount inclusive of the foreign currency portion. The rate of interest was estimated as 21% per year.

SCHEDULE 10-6

Unit ₱1,000

| | Foreign | Local | Total |
|---|---|---|---|
| 1. Equity Capital | ----- | 121,700 | 121,700 |
| 2. Long-Term Loan | 254,400 | 87,600 | 342,000 |
| Total | 254,400 | 209,300 | 463,700 |

## 10.5 Financial Evaluation

### 10.5.1 Cash flow schedule

The cash flow schedule is shown in Schedule 10-8.

### 10.5.2 Net income statement

The net income statement is shown in Schedule 10-9. In the first year after the start of operation, there is a net loss, but in the second year and after, it constantly shows a profit. Accordingly, in the third year and after from the start of operation, a dividend is expected. In the nineth year and after, falling in the time of completion of repayment of the long-term loan, the gross profit rate is high (40% against sales and more than 80% against the equity). The dividend of 40% is also expected.

### 10.5.3 Balance sheet

The balance sheet is shown in Schedule 10-13. In the first year after the start of operation, financial status is difficult but in the second year and after, the internal reserves gradually increase and in the tenth year, it arrives at ₱130,463,000, equivalent to 1.1 times the equity.

### 10.5.4 Internal rate of return

The internal rate of return is shown in Schedules 10-11 and 10-12. The calculation of internal rate of return is based on the following.

(1) Cash flow

Sales revenue only is regarded as cash inflow.

(2) Cash outflow

The calculation of cash outflow is based on the following.

1) Factory cost

Raw materials, utilities, personnel, spare parts, maintenance, technical fee and factory overhead.

2) Operation cost

Factory cost, administrative overhead, sales and distribution.

(3) Additional cashflow

Interest and repayment are added as cash outflow.

(4) IRR

a) IRROI

Investment costs are shown hereunder.

Land cost and working capital were calculated as reclaimed in the 11th year.

| | |
|---|---|
| Fixed investment cost | ₱395,000,000 |
| Pre-operation cost | ₱ 32,700 |
| Working capital | ₱ 36,000,000 |
| Total | ₱463,700,000 |

The result of calculation of the IRROI is shown hereunder.

IRROI before tax : 25.36%
IRROI after tax : 21.34%

b) IRROE

Equity was estimated as ₱121,700,000.
Land cost and working capital were calculated as reclaimed.

IRROE after tax : 21.83%

From the result of calculation of IRR, its rate after tax in terms of both IRROI and IRROE are almost same as the hurdle rate 21%. Being an expansion project of the existing plant, this project can be carried with less initial investment and lower operation cost as compared with a new plant. The reason why IRR is nearly same as the hurdle rate is because bank interest is very high in the Philippines. For successful implementation of this project, it is essential to know the direction of bank interest and find a financial source characterized by low interest.
With the development of technology beyond the company's present level, the production facilities become especially prominent.
The life of this project was determined to be 10 years but the durability of production facilities themselves is

higher than that. In the case that the project life is taken as 15 years, the IRR is as follows. (Refer to Tables AN-3-1 to 4.)

| | | |
|---|---|---|
| IRROI before tax | : | 27.49% |
| IRROI after tax | : | 23.33% |
| IRROE after tax | : | 25.94% |

### 10.5.5 Profit Rate

(1) The pay-back period are shown as follows (unit ₱1,000)

1) Profit

| Item | 2nd year | 3rd year | 4th year | 5th year |
|---|---|---|---|---|
| Net profit | -2,917 | 19,141 | 25,985 | 31,277 |
| Interest | 71,820 | 71,820 | 59,850 | 47,880 |
| Depreciation | 37,268 | 37,268 | 37,268 | 37,268 |
| Profit | 106,171 | 128,229 | 123,103 | 116,425 |

2) Total investment cost

₱468,700

3) Annual net profit plus interest and depreciation

| | Profit | Balance |
|---|---|---|
| 1st year (construction) | ------ | 463,700 |
| 2nd year | 106,171 | 357,529 |
| 3rd year | 128,229 | 229,300 |
| 4th year | 123,103 | 106,197 |
| 5th year | 116,425 | |

4) Pay-back period

The original investment costs will be recovered in less than 4.9 years, including the construction period.

(2) Simple rates of return are shown as follows

Unit %

| Year | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9-10 |
|---|---|---|---|---|---|---|---|---|
| G.P.R. (Sales) | -1 | 12 | 16 | 19 | 24 | 28 | 36 | 41 |
| N.P.R. (Sales) | -1 | 7 | 10 | 12 | 15 | 18 | 24 | 27 |
| N.P.R. (Equity) | -2 | 16 | 21 | 26 | 32 | 38 | 50 | 56 |

(3) The break-even point is shown in the Schedule 10-14

Variable costs are limited to such cost as raw materials, utilities, spare parts, sales and distribution cost, while the others are taken as fixed cost.
Spare parts are spare and consumable parts of machinery and

equipment. If the rate of utilization of the capacity of machinery and equipment goes down, the consumption of spare parts decreases. It doesn't change at the exact same rate as the former, but spare parts are regarded as variable cost.

(4) The ratios of net present value (NPVR) are shown as follows. (Refer to Schedules 10-11 AND 10-12)

$$\text{NPVR (1)} = \frac{468{,}930 \text{ (NPV)}}{463{,}700 \text{ (PVI)}} = 1.00$$

$$\text{NPVR (2)} = \frac{126{,}942 \text{ (NPV)}}{121{,}700 \text{ (PVE)}} = 1.00$$

As stated above, this project can be said to be feasible. For three years after the start of operation, the profitability is low but after that, it becomes higher. Thus, this project is judged to be viable.

### 10.5.6 Sensitive analysis

Calculation of profitability as it varies with sales price, investment and operation cost is as follows.

(1) Variation of sales price

Demand for the products to be manufactured in this project is being met by imports at present. The import duty of 20% is levied on imports at present, but it is supposed that the duties will be reduced to 10% in the near future. Therefore, the sales price is determined to be the same as the import price inclusive of import duty of 10%. In future, it is also considered that import duties may be repealed. So, a variation of -10% is assumed. Meanwhile, since the present import duty of 20% may be kept, a price increase of +10% is also assumed. In due consideration of the above, sensitive analysis has been made.

| Variation ratio (%) | -10 | 0 | +10 |
|---|---|---|---|
| IRROI after tax | 16.68 | 21.34 | 25.48 |
| IRROE after tax | 11.28 | 21.83 | 32.52 |

(2) Variation of investment cost

In due consideration of price variation in future, sensitive analysis of +-10% has been conducted.

| Variation ratio (%) | -10 | 0 | +10 |
|---|---|---|---|
| IRROI after tax | 23.86 | 21.34 | 19.08 |
| IRROE after tax | 25.42 | 21.83 | 18.63 |

(3) Variation of operation cost

In due consideration of price variation in future, sensitive analysis of +-10% has been conducted.

| Variation ratio (%) | -10 | 0 | +10 |
|---|---|---|---|
| IRROI after tax | 28.05 | 21.34 | 19.19 |
| IRROE after tax | 23.32 | 21.83 | 16.77 |

The results of sensitivity analysis are as follows;

a) The estimated IRR of this project is nearly same as the hurdle rate. If sales prices are lowered or investment cost and operation cost rise, however, the IRR can not clear the hurdle rate.

b) In the implementation of this project, if investment cost and operation cost are assumed to rise, it is essential to find a lower-cost source of finance.

c) The sales prices in this project are determined to be equivalent to C & F import price with addition of the equivalent of 10% import duty. The present import duty in the Philippines is 20%. Judging from the economic situation of the Philippines, it can not be considered that import duties will be exempted in the near future and that import costs will be lowered by the 20%. So, the sales prices are determined on the basis of the cost of imports.

### 10.5.7 Reduction of bank interest

The bank interest in 1990 when the field survey of this project was carried out, is so high that it makes the profitability low. Study has been made for the counter measure under the circumstances of high rate of bank interest.

(1) Reduction of bank interest

Calculation has been made for the profitability in case of procurement of loan from foreign countries.

1) Conditions of loan from foreign countries

| | | |
|---|---|---|
| Interest | : | 12% per year |
| Repayment schedule | | |
| Crace period | : | 2 years |
| Repayment period | : | 6 years |
| Amount of loan | : | ₱162,000 |

About 80% of import machinery and equipment

2) Profitability

As shown in Schedule 10-21-1 to -4, IRR is as follows. IRROE is so high that the merit for investor is much.

| | Original Plan | Revised Plan |
|---|---|---|
| IRROI Before Tax | 25.36% | 25.36% |
| IRROI After Tax | 21.34% | 21.34% |
| IRROE After Tax | 21.83% | 26.90% |

(2) Inflation

To estimate the inflation factor in the Philippines is so difficult that the profitability in consideration of inflation factor should not be primarily calculared. Meantime, the rate of bank interest is abnormally high, so that there is a fear of reducong the willingness of investor for investment. Thus, calculation of profitability in consideration of inflation has been made.

1) Inflation rate

The present inflation rate in the Philippines is so high to be 10 - 13%. In the calculation, the following rate has been adopted.

Foreign portion : A large cost-up of raw materials and dispatch fee of foreign engineer is scare, so that the inflation rate has been determined as 5%.

Personnel cost : Personnel cost has close relation with the development of life living. In consideration of development of national living, the inflation rate has been determined as 10%.

Other cost and sales price : The inflation rate has been determined as uniformly 7%.

2) Profitability

As shown in Schedule 10-22-1 to -4, IRR is as follows. In consideration of inflation in future, even though the rate of bank loan is so high, the project can be said to be feasible enough.

| | Original Plan | Revised Plan |
|---|---|---|
| IRROI Before Tax | 25.36% | 35.36% |
| IRROI After Tax | 21.34% | 29.53% |
| IRROE After tax | 21.83% | 40.84% |

(3) Equity ratio

To heighten equity ratio and reduce loan account is effective way in case that the rate of bank interest is high. In the plan of this project, IRROE after tax is 21.83% to exceed bank interest rate 21%. Thus, to heighten equity ratio can not be necessarily expected for the effect. For reference, however, the result of calculation of profitability is shown in Schedule 10-23-1 to -4. In comparison with original plan, it is as follows.

| | Original Plan | Revised Plan |
|---|---|---|
| Equity ratio | 26.25% | 39.18% |
| IRROI Before Tax | 25.36% | 25.36% |
| IRROI After Tax | 21.34% | 21.34% |
| IRROE After tax | 21.83% | 20.66% |

## 10.6 Economic evaluation

### 10.6.1 Economic internal rate of return

Economic internal rate of return of this project has been calculated on the basis of determination of shadow price.

(1) Conversion rate and shadow price of total investment

Shadow price of total investment cost is shown in Schedule 10-16, that is as follows:

Unit ₱1,000

| Item | FC | LC | Total |
|---|---|---|---|
| Plant Construction Cost | 352,501 | 145,175 | 497,676 |
| Pre-operation Cost | 6,600 | 42,450 | 49,050 |
| Initial Investment | 359,101 | 187,625 | 546,726 |
| Working Capital | 21,600 | 18,900 | 40,500 |
| | 380,701 | 206,525 | 587,226 |

Conversion rate was determined by the fundamental thinking as stated hereunder.

(1) Foreign exchange

The conversion rate of foreign exchange is based on the following.

Present foreign exchange rate

US$1 = ₱22.8 = ¥148    1₱ = ¥6.49

Converted foreign exchange rate

US$1 = ₱30.0 = ¥130    1₱ = ¥4.33

The currency used in this study is, in principle, Japanese Yen. Thus, the conversion rate is based on the following.

¥6.49 ÷ ¥4.33 = 1.50

(2) Land

Land cost is the actual Philippines price. So, conversion rate was regarded as 1.0.

(3) Import machinery and equipment

Conversion rate of import machinery and equipment prices was regarded as 1.0 subject to deduction of import duty.

(4) Vehicles

The vehicles required are for industrial use, namely a fork lift truck and shovel loader. The procurement of them is to be made using a local agent. Thus, local currency was allocated. They are not domestically produced but imported, so that conversion rate is regarded as 1.0.

(5) Technical fee and pre-operation expenses

Conversion rate was determined throughout as 1.0, although the local currency portion is included for the reason stated hereunder.

1) The salary of the project engineer in local currency portion is to be paid, for expert services. Thus, the conversion rate was regarded as 1.0.

2) Interest is to be paid to a local commercial bank in local currency, but the loan is to be repaid in foreign currency allocated to the commercial bank by the government of the Philippines. Thus, it was regarded as the same situation as in the case of foreign currency.

(6) Sales price

The products to be produced in this project are import replacement goods. Thus, the prices were determined in relation to the prices of imports. The sales prices determined in this project are the same prices as those of imports. Therefore, the shadow price was determined as the amount sought by multiplying import price exclusive of the 10% import duty by the conversion rate of foreign exchange.

| Item | Conversion Rate |
|---|---|
| Machinery, Equipment and Spare Parts (local) | 0.9 |
| Civil Works | 0.9 |
| Erection Works | 0.9 |
| Raw Materials (local) | 0.9 |
| Electric Power | 0.9 |
| Unskilled Labor | 0.8 |
| Foreign Exchange | 1.5 |
| Other Items | 1.0 |

### 10.6.2 Shadow price of production cost (Schedule 10-17)

Shadow price of production cost is shown in Schedule 10-1.

(1) Conversion rate

Conversion rate is based on the value shown in the preceding item 10.6.1 (2).

(2) Import duties

The import duties of import raw materials are determined as zero.

(3) Depreciation

| | | | |
|---|---|---|---|
| Building (civil works)<br>(₱36,504,000 + ₱700,000) x 0.05 | : | 20 years | ₱1,860,200 |
| Machinery & equipment<br>(₱378,026,000 + ₱12,560,000 + ₱13,965,000) x 0.1 | : | 10 years | ₱40,455,100 |
| Vehicle<br>₱2,100,000 x 1/7 | : | 7 years | ₱300,000 |
| Others<br>₱51,531,000 x 0.1 | : | 10 years | ₱5,153,100 |
| Total | | | ₱47,768,000 |

(4) Financing and interest

a) Financing

| | FC | LC | Total |
|---|---|---|---|
| Equity capital | ------- | ₱121,700,000 | ₱121,700,000 |
| Loan | ₱380,701,000 | ₱ 84,325,000 | ₱465,026,000 |
| Total | ₱380,701,000 | ₱206,025,000 | ₱586,726,000 |

b) Repayment

| | | |
|---|---|---|
| Grace period | : | 2 years |
| Repayment period | : | 6 years |
| | | ₱77,504,333/year |

c) Interest : 21% per year

10.6.3 Sales price

Sales price has been determined to be the same as present C&F import price inclusive of import duty (10%).
The shadow sales price was obtained after multiplication of

the conversion rate of foreign exchange by the sales price on the assumption of import duties to be zero.
Total shadow sales revenue is as follows:

| | 2nd year | 3rd and after |
|---|---|---|
| Sales revenue | ₱278,538,000 | ₱348,172,000 |
| Unit sales price | ₱40,770 | ₱40,770 |

10.6.4 EIRR (Refer to Schedules 10-18 to 20)

| | | |
|---|---|---|
| EIRROI before tax | : | 28.25% |
| EIRROI after tax | : | 23.76% |
| EIRROE after tax | : | 38.12% |

## 10.7 National Economic Evaluation

Refractories are fundamental materials indispensable for various industries using high temperature. Along with the development of various industries, the demand presumably will increase. Basic refractories now being domestically produced are satisfying customer's requirements, but alumina refractories on the other hand are for the most part imported. Meanwhile, the Philippines is blessed with much raw materials suited to the manufacture of alumina refractories, and possess fundamental technology for the manufacture of refractories.

By further exploiting high quality raw materials and making research and development of use method of domestic raw materials although a part of domestic raw materials are used and making domestic production of refractories, reducing reliance on imports, the project contributes to the saving of foreign exchange and promotion of domestic industries. Further, if refractories can be exported in the future, the possibility of earning of foreign exchange becomes large.

### 10.7.1 Amount of foreign exchange saved

(1) The balance after deduction of the amount of payment by the foreign exchanges usable in the project from foreign exchanging amount (C&F price) capable of eliminating imports in accordance with the manufacture and sales in the project is equivalent to the amount of the saving of foreign exchanges, which is shown in Schedule 10-15.

(2) The foreign exchange required for construction of this project is approximately US$11,158,000, equivalent to ₱254,400,000.

Repayment of the said amount together with interest until the 8th year, based on the repayment schedule, does not result in a shortage of foreign exchange during the period.

On the contrary, during 8 years foreign exchanges can be addionally saved by approximately US$1,519,000 equivalent to ₱34,643,000.

(3) In the 9th year and after, foreign exchange of approximately US$5,000,000 can be annually saved.

It corresponds to the savings of US$92,000 per year per employee.

### 10.7.2 Promotion of employment

The suburbs of the plant site can easily supply labour to be newly hired as a result of the project. Such hiring will contribute to the development of the region.

The added-value per new employee through the implementation of this project is as follows.

(1) Investment amount per employee of this project:

₱468,700,000 2160 ÷ 54 = ₱8,679,630

(2) Sales amount per employee in full production capacity year:

₱255,326,000 ÷ 54 = ₱4,728,259

(3) Annual profit amount per employee increases year by year. The profit after tax up to 5th year is as follows.

| | |
|---|---|
| 1st year | ----- |
| 2nd year | ₱54,019 |
| 3rd year | ₱354,463 |
| 4th year | ₱481,204 |
| 5th year | ₱579,203 |

## 10.8. Conclusion

From the result of financial and economic evaluation in the project, the following can be concluded.
In this feasibility study, however, value-added tax (VAT) is not included in the calculation because VAT required for purchase of materials and raw materials is offset from the VAT imposed on the sales amount of the products to customers.

10.8.1 Foreign exchange can be saved by the operation of the project.

10.8.2 In view of the profitability, the project is feasible.

10.8.3 The project is helpful for the exploitation of natural raw materials deposited in the Philippines.

10.8.4 The project contributes to the promotion of employment.

10.8.5 The sales price in this project are determined in linkage with import prices. Present imports require import duty of 20%, but the sales prices in this project are determined as the prices in case of an import duty of 10%.

The sales price is of critical importance in gauging profitability of this project.

In the initial stage of the operation, depreciation and bank interest are high but in the 5th year and after, even if sales price increase by 10%, sufficient profit can be obtained. Moreover, there is high possibility of exporting part the products in the future, and foreign exchanges can be obtained thereby.

SCHEDULE 10 - 2

PRODUCTION COST

Unit: Peso1,000

| Period | Construct | Start up | Full Capacity Year | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Raw materials | --- | 69,020 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 |
| Utilities | --- | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 |
| Personal | --- | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 |
| Spare parts | --- | 1,440 | 2,401 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 |
| Maintenance | --- | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 |
| Technical fee | --- | 5,987 | 5,107 | 5,107 | 8,936 | 8,936 | 8,936 | 0 | 0 | 0 | 0 |
| Factory over head | --- | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 |
| Factory cost | 0 | 90,932 | 108,267 | 109,707 | 113,536 | 113,536 | 113,536 | 104,600 | 104,600 | 104,600 | 104,600 |
| Administrative over head | --- | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 |
| Sales & Distribution | --- | 5,466 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 |
| Operation cost | | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | 0 | 0 | 0 |
| Depreciation | --- | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,068 | 37,068 | 37,068 |
| Total Production cost | 0 | 207,178 | 225,879 | 215,349 | 207,208 | 195,238 | 183,268 | 162,362 | 150,192 | 150,192 | 150,192 |

SCHEDULE 10-3

WORKING CAPITAL

Unit: Peso1,000

| Period / Year | M.D | C.T | Construct 1 | Start up 2 | 3 | 4 | Full Capacity Year 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Current Assets | | | | | | | | | | | | | |
| a. Accounts Receivable | 30 | 12 | --- | 8,174 | 9,733 | 9,853 | 10,172 | 10,172 | 10,172 | 9,427 | 9,427 | 9,427 | 9,427 |
| b. Inventry | | | | | | | | | | | | | |
| Raw materials | 60 | 6 | --- | 11,503 | 14,379 | 14,379 | 14,379 | 14,379 | 14,379 | 14,379 | 14,379 | 14,379 | 14,379 |
| Spare parts | 360 | 1 | --- | 4,801 | 4,801 | 4,801 | 4,801 | 4,801 | 4,801 | 4,801 | 4,801 | 4,801 | 4,801 |
| Work in progress | 10 | 36 | --- | 2,526 | 3,007 | 3,047 | 3,154 | 3,154 | 3,154 | 2,906 | 2,906 | 2,906 | 2,906 |
| Finished products | 30 | 12 | --- | 7,719 | 9,163 | 9,283 | 9,602 | 9,602 | 9,602 | 8,858 | 8,858 | 8.858 | 8,858 |
| c. Cash in hand | | | --- | 1,641 | 1,762 | 1,882 | 2,201 | 2,201 | 2,184 | 1,440 | 1,096 | 1,096 | 1,096 |
| Current Assets | | | 0 | 36,364 | 42,845 | 43,245 | 44,309 | 44,309 | 44,292 | 42,688 | 41,760 | 41,760 | 41,760 |
| 2. Current Liabilities | | | | | | | | | | | | | |
| a. Account payable | 30 | 12 | --- | 6,533 | 7,971 | 7,971 | 7,971 | 7,971 | 7,971 | 7,971 | 7,971' | 7,971 | 7,971 |
| 3. Working Capital | | | | | | | | | | | | | |
| a. Net working Capital | | | --- | 29,831 | 34,874 | 35,274 | 36,338 | 36,338 | 36,321 | 34,717 | 33,789 | 33,789 | 33,789 |
| b. Increase in working capital | | | --- | --- | 5,043 | 400 | 1,064 | 0 | -17 | -1,604 | -928 | 0 | 0 |

The cash balance schedule is based on the following ciculation

| | M.D | C.T | Construct 1 | Start up 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4. Total Production Cost | | | | 207,178 | 225,879 | 215,349 | 207,208 | 195,238 | 183,068 | 162,162 | 145,871 | 145,871 | 145,871 |
| Less Raw materials | | | | 69,020 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 |
| Utilities | | | | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 |
| Interest | | | | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | --- | --- | --- |
| Depreciation | | | | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,068 | 37,068 | 37,068 |
| | 30 | 12 | | 19,696 | 21,143 | 22,583 | 26,412 | 26,412 | 26,212 | 17,276 | 13,155 | 13,155 | 13,155 |
| 5. Required cash balance | | | | 1,641 | 1,762 | 1,882 | 2,201 | 2,201 | 2,184 | 1,440 | 1,096 | 1,096 | 1,096 |

SCHEDULE 10-4

REPAYMENT SCHEDULE AND INTEREST

Unit: Peso1,000

| | Construct 1 | Start up 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Principal | 342,000 | | | | | | | | | | |
| Repayment | --- | --- | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | --- | --- | --- |
| Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | --- | --- | --- |
| Balance | --- | 342,000 | 285,000 | 228,000 | 171,000 | 114,000 | 57,000 | --- | --- | --- | --- |

SCHEDULE 10 - 7/1

PAYMENT SCHEDULE FOR 1ST YEAR

Unit: Peso1,000

| Month | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| PAYMENT | | | | | | |
| A. Plant construction | | | | | | |
| Land | 2,290 | --- | --- | --- | --- | --- |
| Machinery & Equipment | 56,690 | --- | --- | --- | 113,379 | --- |
| Vehicle | --- | --- | --- | --- | --- | --- |
| Civil work | --- | --- | 8,112 | --- | --- | 12,168 |
| Erection work | --- | --- | --- | --- | --- | --- |
| Technical fee | 2,240 | --- | --- | --- | --- | --- |
| Contingencies | 7,450 | --- | 978 | --- | 13,621 | 1,432 |
| Sub-Total | 68,670 | 0 | 9,090 | 0 | 127,000 | 13,600 |
| B. Pre-operating Cost | 1,090 | --- | --- | --- | --- | --- |
| Total | 69,760 | 0 | 9,090 | 0 | 127,000 | 13,600 |
| FINANCE | | | | | | |
| Equity | 74,400 | --- | 17,400 | --- | 29,900 | --- |
| Loan | --- | --- | --- | --- | 81,900 | --- |
| Total | 74,400 | 0 | 17,400 | 0 | 111,800 | 0 |
| Balance | 4,640 | 4,640 | 12,950 | 12,950 | 45,850 | 32,250 |

SCHEDULE 10 - 7/2

PAYMENT SCHEDULE FOR 1ST YEAR Unit: Peso1,000

| Month | 7 | 8 | 9 | 10 | 11 | 12 | Total |
|---|---|---|---|---|---|---|---|
| PAYMENT | | | | | | | |
| A. Plant construction | | | | | | | |
| Land | --- | --- | --- | --- | --- | --- | 2,290 |
| Machinery & Equipment | 113,379 | --- | --- | --- | --- | --- | 283,448 |
| Vehicle | --- | 1,400 | --- | --- | --- | --- | 1,400 |
| Civil work | --- | --- | 12,168 | --- | --- | 8,112 | 40,560 |
| Erection work | --- | --- | 6,978 | --- | --- | 6,978 | 13,956 |
| Technical fee | --- | 2,631 | --- | 2,631 | --- | 2,631 | 10,133 |
| Contingencies | 13,621 | 469 | 2,254 | 369 | --- | 3,019 | 43,213 |
| Sub-Total | 127,000 | 4,500 | 21,400 | 3,000 | 0 | 20,740 | 395,000 |
| B. Pre-operating Cost | --- | --- | --- | --- | --- | 31,610 | 32,700 |
| Total | 127,000 | 4,500 | 21,400 | 3,000 | 0 | 52,350 | 427,700 |
| FINANCE | | | | | | | |
| Equity | --- | --- | --- | --- | --- | --- | 121,700 |
| Loan | 81,900 | --- | --- | --- | --- | 82,000 | 342,000 |
| Total | 81,900 | 0 | 0 | 0 | 0 | 82,000 | 463,700 |
| Balance | 35,250 | 30,750 | 9,350 | 6,350 | 6,350 | 36,000 | |

SCHEDULE 10 - 8

CASH FLOW TABLE FOR FINANCIAL PLANNING

Unit : Peso1,000

| Period<br>Year | Construct<br>1 | Start up<br>2 | 3 | Full Capacity Year<br>4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A. Cash Inflow | | | | | | | | | | | |
| 1. Financial Resource | 463,700 | | | | | | | | | | |
| 2. Sales Revenue | --- | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| B. Cash Outflow | | | | | | | | | | | |
| 1. Fixed investment | 395,000 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2. Pre-operation cost | 32,700 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3. Current asset increase | --- | 36,364 | 6,481 | 400 | 1,064 | 0 | -17 | -1,604 | -928 | --- | --- |
| 4. Current liability increase | --- | -6,533 | -1,438 | --- | --- | --- | --- | --- | --- | --- | --- |
| 5. Operating cost | --- | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| 5. Debt service | | | | | | | | | | | |
| a. Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | --- | --- | --- |
| b. Repayment | --- | --- | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | --- | --- | --- |
| 7. Income tax(35%) | --- | --- | 10,306 | 13,992 | 16,841 | 21,031 | 25,220 | 32,537 | 36,797 | 36,797 | 36,797 |
| 8. Dividend | --- | --- | --- | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| B - Total | 427,700 | 199,741 | 260,960 | 261,643 | 263,100 | 260,341 | 252,543 | 249,537 | 197,673 | 198,601 | 198,601 |
| C. Surplus | | 4,520 | -5,634 | -6,317 | -7,774 | -5,015 | 2,783 | 5,789 | 57,653 | 56,725 | 56,725 |
| D.Accumulated Cash Balance | 36,000 | 40,520 | 34,886 | 28,569 | 20,795 | 15,780 | 18,563 | 24,352 | 82,005 | 138,730 | 195,455 |

Equity Peso121,700.-

## SCHEDULE 10 - 9

### NET INCOME STATEMENT

Unit: Peso1,000

| Period | Construct | Start up | Full Capacity Year | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 1. Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| 2. Production Cost | 0 | 207,178 | 225,379 | 215,349 | 207,208 | 195,238 | 183,268 | 162,362 | 150,192 | 150,192 | 150,192 |
| 3. Pre-operating cost | 32,700 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3. Gross profit (before tax) | -32,700 | -2,917 | 29,447 | 39,977 | 48,118 | 60,088 | 72,058 | 92,964 | 105,134 | 105,134 | 105,134 |
| 4. Income tax(35%) | 0 | 0 | 10,306 | 13,992 | 16,841 | 21,031 | 25,220 | 32,537 | 36,797 | 36,797 | 36,797 |
| 5. Net profit (after tax) | -32,700 | -2,917 | 19,141 | 25,985 | 31,277 | 39,057 | 46,838 | 60,427 | 68,337 | 68,337 | 68,337 |
| 6. Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| 7. Undestributed Profit | -32,700 | -2,917 | 19,141 | 13,815 | 13,022 | 14,717 | 22,498 | 23,917 | 19,657 | 19,657 | 19,657 |
| 8. Accumulated Undestributed Profit | -32,700 | -35,617 | -16,476 | -2,661 | 10,360 | 25,078 | 47,575 | 71,492 | 91,149 | 110,806 | 130,463 |
| Ratio | | | | | | | | | | | |
| Gross Profit: Sales(%) | --- | -1% | 12% | 16% | 19% | 24% | 28% | 36% | 41% | 41% | 41% |
| Net Profit: Sales(%) | --- | -1% | 7% | 10% | 12% | 15% | 18% | 24% | 27% | 27% | 27% |
| Net Profit: Equity(%) | --- | -2% | 16% | 21% | 26% | 32% | 38% | 50% | 56% | 56% | 56% |
| Peso | 121,700 .- | | | | | | | | | | |

SCHEDULE 10-10/1

PRODUCTION COST SCHEDULE

Unit: Peso1,000

| Period | Start up | | | Full capacity year | | | Full capacity year | | | Full capacity year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 2 | | | 3 | | | 4 | | | 5 | | |
| Production Program | 80% | | | 100% | | | 100% | | | 100% | | |
| Currency | FC | LC | Total | FC | LC | Total | FC | LC | Total | FC | LC | Total |
| Raw materials | 60,832 | 8,188 | 69,020 | 76,040 | 10,234 | 86,274 | 76,040 | 10,234 | 86,274 | 76,040 | 10,234 | 86,274 |
| Utilities | 0 | 9,374 | 9,374 | 0 | 9,374 | 9,374 | 0 | 9,374 | 9,374 | 0 | 9,374 | 9,374 |
| Personal | 0 | 2,859 | 2,859 | 0 | 2,859 | 2,859 | 0 | 2,859 | 2,859 | 0 | 2,859 | 2,859 |
| Spare parts | 1,373 | 67 | 1,440 | 2,289 | 112 | 2,401 | 3,662 | 179 | 3,841 | 3,662 | 179 | 3,841 |
| Maintenance | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 |
| Technical fee | 5,927 | 60 | 5,987 | 5,107 | 0 | 5,107 | 5,107 | 0 | 5,107 | 8,936 | 0 | 8,936 |
| Factory over head | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 |
| Factory cost | 68,132 | 22,800 | 90,932 | 83,436 | 24,831 | 108,267 | 84,809 | 24,898 | 109,707 | 88,638 | 24,898 | 113,536 |
| Administrative over head | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 |
| Sales & Distribution | 0 | 5,466 | 5,466 | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 |
| Operation cost | 68,132 | 29,958 | 98,090 | 83,436 | 33,355 | 116,791 | 84,809 | 33,422 | 118,231 | 88,638 | 33,422 | 122,060 |
| Interest | 0 | 71,820 | 71,820 | 0 | 71,820 | 71,820 | 0 | 59,850 | 59,850 | 0 | 47,880 | 47,880 |
| Depreciation | 0 | 37,268 | 37,268 | 0 | 37,268 | 37,268 | 0 | 37,268 | 37,268 | 0 | 37,268 | 37,268 |
| Total Production Cost | 68,132 | 139,046 | 207,178 | 83,436 | 142,443 | 225,879 | 84,809 | 130,540 | 215,349 | 88,638 | 118,570 | 207,208 |

SCHEDULE 10-10/2

PRODUCTION COST SCHEDULE

Unit: Peso1,000

| Period | Full capacity year | | | Full capacity year | | | Full capacity year | | | Full capacity year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 6 | | | 7 | | | 8 | | | 9 - 11 | | |
| Production Program | 100% | | | 100% | | | 100% | | | 100% | | |
| Currency | FC | LC | Total | FC | LC | Total | FC | LC | Total | FC | LC | Total |
| Raw materials | 76,040 | 10,234 | 86,274 | 76,040 | 10,234 | 86,274 | 76,040 | 10,234 | 86,274 | 76,040 | 10,234 | 86,274 |
| Utilities | 0 | 9,374 | 9,374 | 0 | 9,374 | 9,374 | 0 | 9,374 | 9,374 | 0 | 9,374 | 9,374 |
| Personal | 0 | 2,859 | 2,859 | 0 | 2,859 | 2,859 | 0 | 2,859 | 2,859 | 0 | 2,859 | 2,859 |
| Spare parts | 3,662 | 179 | 3,841 | 3,662 | 179 | 3,841 | 3,662 | 179 | 3,841 | 3,662 | 179 | 3,841 |
| Maintenance | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 |
| Technical fee | 8,936 | 0 | 8,936 | 8,936 | 0 | 8,936 | 0 | 0 | 0 | 0 | 0 | 0 |
| Factory over head | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 |
| Factory cost | 88,638 | 24,898 | 113,536 | 88,638 | 24,898 | 113,536 | 79,702 | 24,898 | 104,600 | 79,702 | 24,898 | 104,600 |
| Administrative over head | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 |
| Sales & Distribution | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 |
| Operation cost | 88,638 | 33,422 | 122,060 | 88,638 | 33,422 | 122,060 | 79,702 | 33,422 | 113,124 | 79,702 | 33,422 | 113,124 |
| Interest | 0 | 35,910 | 35,910 | 0 | 23,940 | 23,940 | 0 | 11,970 | 11,970 | 0 | 0 | 0 |
| Depreciation | 0 | 37,268 | 37,268 | 0 | 37,268 | 37,268 | 0 | 37,268 | 37,268 | 0 | 37,068 | 37,068 |
| Total Production Cost | 88,638 | 106,600 | 195,238 | 88,638 | 94,630 | 183,268 | 79,702 | 82,660 | 162,362 | 79,702 | 70,490 | 150,192 |

SCHEDULE 10 - 11

INTERNAL RATE OF RETURN ON INVESTMENT

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| Gross cash inflow | 0 | 106,171 | 138,535 | 137,095 | 133,266 | 133,266 | 133,266 | 142,202 | 142,202 | 142,202 | 142,202 |
| Income tax(35%) | - | 0 | 10,306 | 13,992 | 16,841 | 21,031 | 25,220 | 32,537 | 36,797 | 36,797 | 36,797 |
| Net cash inflow | 0 | 106,171 | 128,229 | 123,103 | 116,425 | 112,235 | 108,046 | 109,665 | 105,405 | 105,405 | 105,405 |
| Net Present Value(21%) | | 87,740 | 87,580 | 69,492 | 54,312 | 43,267 | 34,423 | 28,875 | 22,936 | 18,952 | 15,663 |
| | | | | | | | | | | N.P.V. Total = | 463,240 |
| Reclaim | | | | | | | | | | | 38,290 |
| | | | | | | | | | | N.P.V.: | 5,690 |

Investment Peso463,700.-

IRROI : Before tax : 25.36%
IRROI : After tax : 21.34%

## SCHEDULE 10 - 12

### INTERNAL RATE OF RETURN ON EQUITY

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| c) Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | 0 | 0 | 0 |
| d) Repayment | - | - | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 0 | 0 | 0 |
| Total (b+c+d) | 0 | 169,910 | 245,611 | 235,081 | 225,940 | 214,970 | 203,000 | 182,094 | 113,124 | 113,124 | 113,124 |
| Net cash inflow | 0 | 34,351 | 9,715 | 20,245 | 28,386 | 40,356 | 52,326 | 73,232 | 142,202 | 142,202 | 142,202 |
| Income tax(35%) | - | 0 | 10,306 | 13,992 | 16,841 | 21,031 | 25,220 | 32,537 | 36,797 | 36,797 | 36,797 |
| Retained cash | 0 | 34,351 | -591 | 6,253 | 11,545 | 19,325 | 27,106 | 40,695 | 105,405 | 105,405 | 105,405 |
| Net Present Value(21%) | | 28,388 | -404 | 3,530 | 5,386 | 7,450 | 8,636 | 10,715 | 22,936 | 18,952 | 15,663 |
| | | | | | | | | | N.P.V. Total = | | 121,252 |
| Reclaim | | | | | | | | | | | 38,290 |
| | | | | | | | | | | N.P.V.: | 5,690 |
| Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| Retained cash after dividend | 0 | 34,351 | -591 | -5,917 | -6,710 | -5,015 | 2,766 | 4,185 | 56,725 | 56,725 | 56,725 |
| Accumulated cash | 0 | 34,351 | 33,760 | 27,843 | 21,132 | 16,118 | 18,883 | 23,068 | 79,793 | 136,518 | 193,243 |

Equity Peso121,700.-

IRROE : After tax : 21.83%

SCHEDULE 10 - 13

PROJECTED BALANCE SHEET

Unit : Peso1,000

| Period / Year | Construct 1 | Start up 2 | 3 | Full Capacity Year 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A. Asset (Total) | | | | | | | | | | | |
| 1. Current assets | | | | | | | | | | | |
| (a) Cash balance (From schedule 10-8) | 36,000 | 40,520 | 34,886 | 28,569 | 20,795 | 15,780 | 18,563 | 24,352 | 82,005 | 138,730 | 195,455 |
| (b) Current assets (Frcm schedule 10-3) | 0 | 36,364 | 42,845 | 43,245 | 44,309 | 44,309 | 44,292 | 42,688 | 41,760 | 41,760 | 41,760 |
| Sub-Total | 36,000 | 76,884 | 77,731 | 71,814 | 65,104 | 60,089 | 62,855 | 67,040 | 123,765 | 180,490 | 237,215 |
| 2. Fixed assets | 395,000 | 357,732 | 320,464 | 283,196 | 245,928 | 208,660 | 171,392 | 134,124 | 97,056 | 59,988 | 22,920 |
| 3. Losses | 32,700 | 35,617 | 16,476 | 2,661 | --- | --- | --- | --- | --- | --- | --- |
| Total | 463,700 | 470,233 | 414,671 | 357,671 | 311,032 | 268,749 | 234,247 | 201,164 | 220,821 | 240,478 | 260,135 |
| B. Liabilities | | | | | | | | | | | |
| 1. Loan | 342,000 | 342,000 | 285,000 | 228,000 | 171,000 | 114,000 | 57,000 | --- | --- | --- | --- |
| 2. Equity | 121,700 | 121,700 | 121,700 | 121,700 | 121,700 | 121,700 | 121,700 | 121,700 | 121,700 | 121,700 | 121,700 |
| 3. Current liability | --- | 6,533 | 7,971 | 7,971 | 7,971 | 7,971 | 7,971 | 7,971 | 7,971 | 7,971 | 7,971 |
| 4. Reserve | --- | --- | --- | --- | 10,360 | 25,078 | 47,575 | 71,492 | 91,149 | 110,806 | 130,463 |
| Total | 463,700 | 470,233 | 414,671 | 357,671 | 311,031 | 268,749 | 234,246 | 201,163 | 220,820 | 240,477 | 260,134 |

SCHEDULE 10-14/1

BREAK EVEN POINT

Unit: Peso1,000

| Period | Start up | | | Full capacity year | | | Full capacity year | | | Full capacity year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 2 | | | 3 | | | 4 | | | 5 | | |
| Production Program | 80% | | | 100% | | | 100% | | | 100% | | |
| Currency | Fixed | Variable | Total | Fixed | Variable | Total | Fixed | Variable | Total | Fixed | Variable | Total |
| Raw materials | 0 | 69,020 | 69,020 | 0 | 86,274 | 86,274 | 0 | 86,274 | 86,274 | 0 | 86,274 | 86,274 |
| Utilities | 0 | 9,374 | 9,374 | 0 | 9,374 | 9,374 | 0 | 9,374 | 9,374 | 0 | 9,374 | 9,374 |
| Personal | 2,859 | 0 | 2,859 | 2,859 | 0 | 2,859 | 2,859 | 0 | 2,859 | 2,859 | 0 | 2,859 |
| Spare parts | 0 | 1,440 | 1,440 | 0 | 2,401 | 2,401 | 0 | 3,841 | 3,841 | 0 | 3,841 | 3,841 |
| Maintenance | 1,120 | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 | 0 | 1,120 |
| Technical fee | 5,987 | 0 | 5,987 | 0 | 5,107 | 5,107 | 0 | 5,107 | 5,107 | 0 | 8,936 | 8,936 |
| Factory over head | 1,132 | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 | 0 | 1,132 |
| Factory cost | 11,098 | 79,834 | 90,932 | 5,111 | 103,156 | 108,267 | 5,111 | 104,596 | 109,707 | 5,111 | 108,425 | 113,536 |
| Administrative over head | 1,692 | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 | 0 | 1,692 |
| Sales & Distribution | 0 | 5,466 | 5,466 | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 |
| Operation cost | 12,790 | 85,300 | 98,090 | 6,803 | 109,988 | 116,791 | 6,803 | 111,428 | 118,231 | 6,803 | 115,257 | 122,060 |
| Interest | 71,820 | 0 | 71,820 | 71,820 | 0 | 71,820 | 59,850 | 0 | 59,850 | 47,880 | 0 | 47,880 |
| Depreciation | 37,268 | 0 | 37,268 | 37,268 | 0 | 37,268 | 37,268 | 0 | 37,268 | 37,268 | 0 | 37,268 |
| Total Production Cost | 121,878 | 85,300 | 207,178 | 115,891 | 109,988 | 225,879 | 103,921 | 111,428 | 215,349 | 91,951 | 115,257 | 207,208 |
| Unit Cost (Peso) | 17.839 | 12.485 | 30.325 | 13.570 | 12.879 | 26.450 | 12.169 | 13.048 | 25.217 | 10.767 | 13.496 | 24.263 |
| Unit Sales Price (Peso) | | | 29.898 | | | 29.898 | | | 29.898 | | | 29.898 |
| Break Even Point (%) | | | 102.0% | | | 79.7% | | | 72.2% | | | 65.6% |

SCHEDULE 10-14/2

BREAK EVEN POINT

Unit: Peso1,000

| Period | Full capacity year | | | Full capacity year | | | Full capacity year | | | Full capacity year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 6 | | | 7 | | | 8 | | | 9 - 11 | | |
| Production Program | 100% | | | 100% | | | 100% | | | 100% | | |
| Currency | Fixed | Variable | Total | Fixed | Variable | Total | Fixed | Variable | Total | Fixed | Variable | Total |
| Raw materials | 0 | 86,274 | 86,274 | 0 | 86,274 | 86,274 | 0 | 86,274 | 86,274 | 0 | 86,274 | 86,274 |
| Utilities | 0 | 9,374 | 9,374 | 0 | 9,374 | 9,374 | 0 | 9,374 | 9,374 | 0 | 9,374 | 9,374 |
| Personal | 2,859 | 0 | 2,859 | 2,859 | 0 | 2,859 | 2,859 | 0 | 2,859 | 2,859 | 0 | 2,859 |
| Spare parts | 0 | 3,841 | 3,841 | 0 | 3,841 | 3,841 | 0 | 3,841 | 3,841 | 0 | 3,841 | 3,841 |
| Maintenance | 1,120 | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 | 0 | 1,120 |
| Technical fee | 0 | 8,936 | 8,936 | 0 | 8,936 | 8,936 | 0 | 0 | 0 | 0 | 0 | 0 |
| Factory over head | 1,132 | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 | 0 | 1,132 |
| Factory cost | 5,111 | 108,425 | 113,536 | 5,111 | 108,425 | 113,536 | 5,111 | 99,489 | 104,600 | 5,111 | 99,489 | 104,600 |
| Administrative over head | 1,692 | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 | 0 | 1,692 |
| Sales & Distribution | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 |
| Operation cost | 6,803 | 115,257 | 122,060 | 6,803 | 115,257 | 122,060 | 6,803 | 106,321 | 113,124 | 6,803 | 106,321 | 113,124 |
| Interest | 35,910 | 0 | 35,910 | 23,940 | 0 | 23,940 | 11,970 | 0 | 11,970 | 0 | 0 | 0 |
| Depreciation | 37,268 | 0 | 37,268 | 37,268 | 0 | 37,268 | 37,268 | 0 | 37,268 | 37,068 | 0 | 37,068 |
| Total Production Cost | 79,981 | 115,257 | 195,238 | 68,011 | 115,257 | 183,268 | 56,041 | 106,321 | 162,362 | 43,871 | 106,321 | 150,192 |
| Unit Cost (Peso) | 9.365 | 13.496 | 22.862 | 7.964 | 13.496 | 21.460 | 6.562 | 12.450 | 19.012 | 5.137 | 12.450 | 17.587 |
| Unit Sales Price (Peso) | | | 29.898 | | | 29.898 | | | 29.898 | | | 29.898 |
| Break Even Point (%) | | | 57.1% | | | 48.6% | | | 37.6% | | | 29.4% |

## SCHEDULE 10 - 15

### FOREIGN EXCHANGE SAVING

Unit : Peso1,000

| Period<br>Year | Construct<br>1 | Start up<br>2 | 3 | Full Capacity Year<br>4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Foreign Exchange Value of Products | --- | 154,693 | 193,366 | 193,366 | 193,366 | 193,366 | 193,366 | 193,366 | 193,366 | 193,366 | 193,366 |
| Foreign Exchange Value of: | | | | | | | | | | | |
| Materials | --- | 60,832 | 76,040 | 76,040 | 76,040 | 76,040 | 76,040 | 76,040 | 76,040 | 76,040 | 76,040 |
| Spare parts | --- | 1,373 | 2,289 | 3,662 | 3,662 | 3,662 | 3,662 | 3,662 | 3,662 | 3,662 | 3,662 |
| Technical | --- | 5,927 | 5,107 | 5,107 | 8,936 | 8,936 | 8,936 | --- | --- | --- | --- |
| Foreign Exchange Repayment | | | | | | | | | | | |
| Principal | --- | --- | 42,400 | 42,400 | 42,400 | 42,400 | 42,400 | 42,400 | --- | --- | --- |
| Interest | --- | 53,424 | 53,424 | 44,520 | 35,616 | 26.712 | 17,808 | 8,904 | --- | --- | --- |
| Sub-Total | | 121,556 | 179,260 | 171,729 | 166,654 | 157,750 | 148,846 | 131,006 | 79,702 | 79,702 | 79,702 |
| Foreign Exchange Saving | --- | 33,137 | 14,106 | 21,637 | 26,712 | 35,616 | 44,520 | 62,360 | 113,664 | 113,664 | 113,664 |
| Equivalent to US$1,000 | --- | 1,453 | 619 | 949 | 1,172 | 1,562 | 1,953 | 2,735 | 4,985 | 4,985 | 4,985 |
| Accumulated (Peso1,000) | --- | 33,137 | 47,243 | 68,880 | 95,592 | 131,208 | 175,728 | 238,088 | 351,752 | 465,416 | 579,080 |
| Equivalent to US$1,000 | --- | 1,453 | 2,072 | 3,021 | 4,193 | 5,755 | 7,707 | 10,442 | 15,428 | 20,413 | 25,398 |
| Job forein exchange saving (US$/head) | --- | 26.907 | 11.463 | 17.574 | 21.704 | 28.926 | 36.167 | 50.648 | 92.315 | 92.315 | 92.315 |

SCHEDULE 10 - 2 - SAL90

PRODUCTION COST (Sales Variation 90%) Unit: Peso1,000

| Period | Construct | Start up | | | | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Raw materials | --- | 69,020 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 |
| Utilities | --- | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 |
| Personal | --- | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 |
| Spare parts | --- | 1,440 | 2,401 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 |
| Maintenance | --- | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 |
| Technical fee | --- | 5,987 | 5,107 | 5,107 | 8,936 | 8,936 | 8,936 | 0 | 0 | 0 | 0 |
| Factory over head | --- | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 |
| Factory cost | 0 | 90,932 | 108,267 | 109,707 | 113,536 | 113,536 | 113,536 | 104,600 | 104,600 | 104,600 | 104,600 |
| Administrative over head | --- | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 |
| Sales & Distribution | --- | 5,466 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 |
| Operation cost | | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | 0 | 0 | 0 |
| Depreciation | --- | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,068 | 37,068 | 37,068 |
| Total Production cost | 0 | 207,178 | 225,879 | 215,349 | 207,208 | 195,238 | 183,268 | 162,362 | 150,192 | 150,192 | 150,192 |

SCHEDULE 10 - 9 - SAL90

NET INCOME STATEMENT (Sales Variation 90%) Unit: Peso1,000

| Period | Construct | Start up | | | | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 1. Sales revenue | 0 | 183,835 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 |
| 2. Production Cost | 0 | 207,178 | 225,879 | 215,349 | 207,208 | 195,238 | 183,268 | 162,362 | 150,192 | 150,192 | 150,192 |
| 3. Gross profit (before tax) | 0 | -23,343 | 3,914 | 14,444 | 22,585 | 34,555 | 46,525 | 67,431 | 79,601 | 79,601 | 79,601 |
| 4. Income tax(35%) | 0 | 0 | 1,370 | 5,055 | 7,905 | 12,094 | 16,284 | 23,601 | 27,860 | 27,860 | 27,860 |
| 5. Net profit (after tax) | 0 | -23,343 | 2,544 | 9,389 | 14,681 | 22,461 | 30,242 | 43,830 | 51,741 | 51,741 | 51,741 |
| 6. Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| 7. Undestributed Profit | 0 | -23,343 | 2,544 | -2,781 | -3,574 | -1,879 | 5,902 | 7,320 | 3,061 | 3,061 | 3,061 |
| 8. Accumulated Undestributed Profit | 0 | -23,343 | -20,799 | -23,580 | -27,154 | -29,033 | -23,132 | -15,811 | -12,751 | -9,690 | -6,629 |
| Ratio | | | | | | | | | | | |
| Gross Profit: Sales(%) | --- | -13% | 2% | 6% | 10% | 15% | 20% | 29% | 35% | 35% | 35% |
| Net Profit: Sales(%) | --- | -13% | 1% | 4% | 6% | 10% | 13% | 19% | 23% | 23% | 23% |
| Net Profit: Equity(%) | --- | -19% | 2% | 8% | 12% | 18% | 25% | 36% | 43% | 43% | 43% |

Peso 121,700 .-

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SCHEDULE 10 - 11 - SAL90

INTERNAL RATE OF RETURN ON INVESTMENT
(Sales Variation 90%)

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 183,835 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| Gross cash inflow | 0 | 85,745 | 113,002 | 111,562 | 107,733 | 107,733 | 107,733 | 116,669 | 116,669 | 116,669 | 116,669 |
| Income tax(35%) | - | 0 | 1,370 | 5,056 | 7,905 | 12,094 | 16,284 | 23,601 | 27,860 | 27,860 | 27,860 |
| Net cash inflow | 0 | 85,745 | 111,632 | 106,507 | 99,829 | 95,639 | 91,450 | 93,068 | 88,809 | 88,809 | 88,809 |
| Net Present Value(21%) | | 70,860 | 76,245 | 60,123 | 46,570 | 36,869 | 29,136 | 24,505 | 19,325 | 15,968 | 13,197 |
| | | | | | | | | | N.P.V. Total = | | 392,798 |
| Reclaim | | | | | | | | | | | 38,290 |
| | | | | | | | | | | N.P.V.: | 5,690 |

Investment Peso463,700.-

IRROI : Before tax : 19.37%
IRROI : After tax : 16.68%

SCHEDULE 10 - 12 - SAL90

INTERNAL RATE OF RETURN ON EQUITY
(Sales Variation 90%)

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 183,835 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 | 229,793 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| c) Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | 0 | 0 | 0 |
| d) Repayment | - | - | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 0 | 0 | 0 |
| Total (b+c+d) | 0 | 169,910 | 245,611 | 235,081 | 226,940 | 214,970 | 203,000 | 182,094 | 113,124 | 113,124 | 113,124 |
| Net cash inflow | 0 | 13,925 | -15,818 | -5,288 | 2,853 | 14,823 | 26,793 | 47,699 | 116,669 | 116,669 | 116,669 |
| Income tax(35%) | - | 0 | 1,370 | 5,056 | 7,905 | 12,094 | 16,284 | 23,601 | 27,860 | 27,860 | 27,860 |
| Retained cash | 0 | 13,925 | -17,188 | -10,343 | -5,051 | 2,729 | 10,510 | 24,098 | 88,809 | 88,809 | 88,809 |
| Net Present Value(21%) | | 11,508 | -11,739 | -5,839 | -2,357 | 1,052 | 3,348 | 6,345 | 19,325 | 15,968 | 13,197 |
| | | | | | | | | | N.P.V. Total = | | 50,808 |
| Reclaim | | | | | | | | | | | 38,290 |
| | | | | | | | | | | N.P.V.: | 5,690 |
| Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| Retained cash after dividend | 0 | 13,925 | -17,188 | -22,513 | -23,306 | -21,611 | -13,830 | -12,412 | 40,129 | 40,129 | 40,129 |
| Accumulated cash | 0 | 13,925 | -3,263 | -25,776 | -49,082 | -70,693 | -84,524 | -96,935 | -56,807 | -16,678 | 23,451 |

Equity Peso121,700.-

IRROE : After tax : 11.28%

SCHEDULE 10 - 2 - SAL110

PRODUCTION COST (Sales Variation 110%) Unit: Peso1,000

| Period | Construct | Start up | | | Full Capacity Year | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Raw materials | --- | 69,020 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 |
| Utilities | --- | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 |
| Personal | --- | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 |
| Spare parts | --- | 1,440 | 2,401 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 |
| Maintenance | --- | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 |
| Technical fee | --- | 5,987 | 5,107 | 5,107 | 8,936 | 8,936 | 8,936 | 0 | 0 | 0 | 0 |
| Factory over head | --- | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 |
| Factory cost | 0 | 90,932 | 108,267 | 109,707 | 113,536 | 113,536 | 113,536 | 104,600 | 104,600 | 104,600 | 104,600 |
| Administrative over head | --- | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 |
| Sales & Distribution | --- | 5,466 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 |
| Operation cost | | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | 0 | 0 | 0 |
| Depreciation | --- | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,068 | 37,068 | 37,068 |
| Total Production cost | 0 | 207,178 | 225,879 | 215,349 | 207,208 | 195,238 | 183,268 | 162,362 | 150,192 | 150,192 | 150,192 |

SCHEDULE 10 - 9 - SAL110

NET INCOME STATEMENT (Sales Variation 1100%) Unit: Peso1,000

| Period | Construct | Start up | Full Capacity Year | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 1. Sales revenue | 0 | 224,687 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 |
| 2. Production Cost | 0 | 207,178 | 225,879 | 215,349 | 207,208 | 195,238 | 183,268 | 162,362 | 150,192 | 150,192 | 150,192 |
| 3. Gross profit (before tax) | 0 | 17,509 | 54,980 | 65,510 | 73,651 | 85,621 | 97,591 | 118,497 | 130,667 | 130,667 | 130,667 |
| 4. Income tax(35%) | 0 | 6,128 | 19,243 | 22,928 | 25,778 | 29,967 | 34,157 | 41,474 | 45,733 | 45,733 | 45,733 |
| 5. Net profit (after tax) | 0 | 11,381 | 35,737 | 42,581 | 47,873 | 55,653 | 63,434 | 77,023 | 84,933 | 84,933 | 84,933 |
| 6. Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| 7. Undestributed Profit | 0 | 11,381 | 35,737 | 30,411 | 29,618 | 31,313 | 39,094 | 40,513 | 36,253 | 36,253 | 36,253 |
| 8. Accumulated Undestributed Profit | 0 | 11,381 | 47,118 | 77,529 | 107,147 | 138,460 | 177,554 | 218,067 | 254,320 | 290,573 | 326,827 |
| Ratio | | | | | | | | | | | |
| Gross Profit: Sales(%) | --- | 8% | 20% | 23% | 26% | 30% | 35% | 42% | 47% | 47% | 47% |
| Net Profit: Sales(%) | --- | 5% | 13% | 15% | 17% | 20% | 23% | 27% | 30% | 30% | 30% |
| Net Profit: Equity(%) | --- | 9% | 29% | 35% | 39% | 46% | 52% | 63% | 70% | 70% | 70% |
| Peso 121,700 .- | | | | | | | | | | | |

SCHEDULE 10 - 11 - SAL110

INTERNAL RATE OF RETURN ON INVESTMENT
(Sales Variation 110%)

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 224,687 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| Gross cash inflow | 0 | 126,597 | 164,068 | 162,628 | 158,799 | 158,799 | 158,799 | 167,735 | 167,735 | 167,735 | 167,735 |
| Income tax(35%) | - | 6,128 | 19,243 | 22,928 | 25,778 | 29,967 | 34,157 | 41,474 | 45,733 | 45,733 | 45,733 |
| Net cash inflow | 0 | 120,469 | 144,825 | 139,699 | 133,021 | 128,831 | 124,642 | 126,261 | 122,001 | 122,001 | 122,001 |
| Net Present Value(21%) | | 99,556 | 98,915 | 78,860 | 62,054 | 49,665 | 39,711 | 33,244 | 26,547 | 21,936 | 18,129 |
| | | | | | | | | | N.P.V. Total = | | 528,617 |
| Reclaim | | | | | | | | | | | 38,290 |
| | | | | | | | | | | N.P.V.: | 5,690 |

Investment Peso463,700.-

IRROI : Before tax : 31.05%
IRROI : After tax : 25.48%

SCHEDULE 10 - 12 - SAL110

INTERNAL RATE OF RETURN ON EQUITY
(Sales Variation 110%)

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 224,687 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 | 280,859 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| c) Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | 0 | 0 | 0 |
| d) Repayment | - | - | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 0 | 0 | 0 |
| Total (b+c+d) | 0 | 169,910 | 245,611 | 235,081 | 226,940 | 214,970 | 203,000 | 182,094 | 113,124 | 113,124 | 113,124 |
| Net cash inflow | 0 | 54,777 | 35,248 | 45,778 | 53,919 | 65,889 | 77,859 | 98,765 | 167,735 | 167,735 | 167,735 |
| Income tax(35%) | - | 6,128 | 19,243 | 22,928 | 25,778 | 29,967 | 34,157 | 41,474 | 45,733 | 45,733 | 45,733 |
| Retained cash | 0 | 48,649 | 16,005 | 22,849 | 28,141 | 35,921 | 43,702 | 57,291 | 122,001 | 122,001 | 122,001 |
| Net Present Value(21%) | | 40,203 | 10,931 | 12,898 | 13,128 | 13,848 | 13,923 | 15,085 | 26,547 | 21,936 | 18,129 |
| | | | | | | | | | N.P.V. Total = | | 186,628 |
| Reclaim | | | | | | | | | | | 38,290 |
| | | | | | | | | | | N.P.V.: | 5,690 |
| Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| Retained cash after dividend | 0 | 48,649 | 16,005 | 10,679 | 9,886 | 11,581 | 19,362 | 20,781 | 73,321 | 73,321 | 73,321 |
| Accumulated cash | 0 | 48,649 | 64,654 | 75,333 | 85,219 | 96,800 | 116,162 | 136,943 | 210,264 | 283,585 | 356,907 |

Equity Peso121,700.-

IRROE : After tax : 32.52%

SCHEDULE 10 - 2 - INV090

PRODUCTION COST (Investment Variation 90%) Unit: Peso1,000

| Period | Construct | Start up | | | | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Raw materials | --- | 69,020 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 |
| Utilities | --- | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 |
| Personal | --- | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 |
| Spare parts | --- | 1,440 | 2,401 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 |
| Maintenance | --- | 1,008 | 1,008 | 1,008 | 1,008 | 1,008 | 1,008 | 1,008 | 1,008 | 1,008 | 1,008 |
| Technical fee | --- | 5,987 | 5,107 | 5,107 | 8,936 | 8,936 | 8,936 | 0 | 0 | 0 | 0 |
| Factory over head | --- | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 |
| Factory cost | 0 | 90,820 | 108,155 | 109,595 | 113,424 | 113,424 | 113,424 | 104,488 | 104,488 | 104,488 | 104,488 |
| Administrative over head | --- | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 |
| Sales & Distribution | --- | 5,466 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 |
| Operation cost | | 97,978 | 116,679 | 118,119 | 121,948 | 121,948 | 121,948 | 113,012 | 113,012 | 113,012 | 113,012 |
| Interest | --- | 64,638 | 64,638 | 53,865 | 43,092 | 32,319 | 21,546 | 10,773 | 0 | 0 | 0 |
| Depreciation | --- | 33,541 | 33,541 | 33,541 | 33,541 | 33,541 | 33,541 | 33,541 | 33,361 | 33,361 | 33,361 |
| Total Production cost | 0 | 196,157 | 214,858 | 205,525 | 198,581 | 187,808 | 177,035 | 157,326 | 146,373 | 146,373 | 146,373 |

SCHEDULE 10 - 9 - INV090

NET INCOME ST, TEMENT (Investment Variation 90%) Unit: Peso1,000

| Period | Construct | Start up | Full Capacity Year | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 1. Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| 2. Production Cost | 0 | 196,157 | 214,858 | 205,525 | 198,581 | 187,808 | 177,035 | 157,326 | 146,373 | 146,373 | 146,373 |
| 3. Gross profit (before tax) | 0 | 8,104 | 40,468 | 19,801 | 56,745 | 67,518 | 78,291 | 98,000 | 108,953 | 108,953 | 108,953 |
| 4. Income tax(35: | 0 | 2,836 | 14,164 | 17,430 | 19,861 | 25,631 | 27,402 | 34,300 | 38,133 | 38,133 | 38,133 |
| 5. Net profit (after tax) | 0 | 5,267 | 26,304 | 32,371 | 36,884 | 43,887 | 50,889 | 63,700 | 70,819 | 70,819 | 70,819 |
| 6. Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| 7. Undestributed Profit | 0 | 5,267 | 26,304 | 20,201 | 18,629 | 19,547 | 26,549 | 27,190 | 22,139 | 22,139 | 22,139 |
| 8. Accumulated Undestributed Profit | 0 | 5,267 | 31,572 | 51,772 | 70,401 | 89,948 | 116,497 | 143,687 | 165,826 | 187,965 | 210,105 |
| Ratio | | | | | | | | | | | |
| Gross Profit: Sales(%) | --- | 4% | 16% | 20% | 22% | 26% | 31% | 38% | 43% | 43% | 43% |
| Net Profit: Sales(%) | --- | 3% | 10% | 13% | 14% | 17% | 20% | 25% | 28% | 28% | 28% |
| Net Profit: Equity(%) | --- | 4% | 22% | 27% | 30% | 36% | 42% | 52% | 58% | 58% | 58% |

Peso 121,700 .-

SCHEDULE 10 - 11 - INV090

INTERNAL RATE OF RETURN ON INVESTMENT
(Investment Variation 90%)

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 97,978 | 116,679 | 118,119 | 121,948 | 121,948 | 121,948 | 113,012 | 113,012 | 113,012 | 113,012 |
| Gross cash inflow | 0 | 106,283 | 138,647 | 137,207 | 133,378 | 133,378 | 133,378 | 142,314 | 142,314 | 142,314 | 142,314 |
| Income tax(35%) | - | 2,836 | 14,164 | 17,430 | 19,861 | 23,631 | 27,402 | 34,300 | 38,133 | 38,133 | 38,133 |
| Net cash inflow | 0 | 103,447 | 124,483 | 119,777 | 113,517 | 109,747 | 105,976 | 108,014 | 104,181 | 104,181 | 104,181 |
| Net Present Value(21%) | | 85,488 | 85,022 | 67,614 | 52,956 | 42,307 | 33,764 | 28,440 | 22,670 | 18,732 | 15,481 |
| | | | | | | | | | | N.P.V. Total = | 452,474 |
| Reclaim | | | | | | | | | | | 34,461 |
| | | | | | | | | | | N.P.V.: | 5,121 |

Investment Peso417,330.-

IRROI : Before tax : 28.79%
IRROI : After tax : 23.86%

SCHEDULE 10 - 12 - INV090

INTERNAL RATE OF RETURN ON EQUITY
(Investment Variation 90%)

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 97,978 | 116,679 | 118,119 | 121,948 | 121,948 | 121,948 | 113,012 | 113,012 | 113,012 | 113,012 |
| c) Interest | --- | 64,638 | 64,638 | 53,865 | 43,092 | 32,319 | 21,546 | 10,773 | 0 | 0 | 0 |
| d) Repayment | - | - | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 0 | 0 | 0 |
| Total (b+c+d) | 0 | 162,616 | 238,317 | 228,984 | 222,040 | 211,267 | 200,494 | 180,785 | 113,012 | 113,012 | 113,012 |
| Net cash inflow | 0 | 41,645 | 17,009 | 26,342 | 33,286 | 44,059 | 54,832 | 74,541 | 142,314 | 142,314 | 142,314 |
| Income tax(35%) | - | 2,836 | 14,164 | 17,430 | 19,861 | 23,631 | 27,402 | 34,300 | 38,133 | 38,133 | 38,133 |
| Retained cash | 0 | 38,809 | 2,845 | 8,912 | 13,425 | 20,428 | 27,430 | 40,241 | 104,181 | 104,181 | 104,181 |
| Net Present Value(21%) | | 32,071 | 1,943 | 5,031 | 6,263 | 7,875 | 8,739 | 10,595 | 22,670 | 18,732 | 15,481 |
| | | | | | | | | | N.P.V. Total = | | 129,400 |
| Reclaim | | | | | | | | | | | 34,461 |
| | | | | | | | | | | N.P.V.: | 5,121 |
| Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| Retained cash after dividend | 0 | 38,809 | 2,845 | -3,258 | -4,830 | -3,912 | 3,090 | 3,731 | 55,501 | 55,501 | 55,501 |
| Accumulated cash | 0 | 38,809 | 41,654 | 38,396 | 33,566 | 29,654 | 32,744 | 36,475 | 91,976 | 147,476 | 202,977 |

Equity Peso109,530.-

IRROE : After tax : 25.42%

SCHEDULE 10 - 2 - INV110

PRODUCTION COST (Investment Variation 110%) Unit: Peso1,000

| Period | Construct | Start up | | | | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Raw materials | --- | 69,020 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 |
| Utilities | --- | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 |
| Personal | --- | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 |
| Spare parts | -- | 1,440 | 2,401 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 |
| Maintenance | --- | 1,232 | 1,232 | 1,232 | 1,232 | 1,232 | 1,232 | 1,232 | 1,232 | 1,232 | 1,232 |
| Technical fee | --- | 5,987 | 5,107 | 5,107 | 8,936 | 8,936 | 8,936 | 0 | 0 | 0 | 0 |
| Factory over head | --- | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 |
| Factory cost | 0 | 91,044 | 108,379 | 109,819 | 113,648 | 113,648 | 113,648 | 104,712 | 104,712 | 104,712 | 104,712 |
| Administrative over head | --- | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 |
| Sales & Distribution | --- | 5,466 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 |
| Operation cost | | 98,202 | 116,903 | 118,343 | 122,172 | 122,172 | 122,172 | 113,236 | 113,236 | 113,236 | 113,236 |
| Interest | --- | 79,002 | 79,002 | 65,835 | 52,668 | 39,501 | 26,334 | 13,167 | 0 | 0 | 0 |
| Depreciation | --- | 40,995 | 40,995 | 40,995 | 40,995 | 40,995 | 40,995 | 40,995 | 40,775 | 40,775 | 40,775 |
| Total Production cost | 0 | 218,199 | 236,900 | 225,173 | 215,835 | 202,668 | 189,501 | 167,398 | 154,011 | 154,011 | 154,011 |

SCHEDULE 10 - 9 - INV110

NET INCOME STATEMENT (Investment Variation 110%) Unit: Peso1,000

| Period | Construct | Start up | | | | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 1. Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| 2. Production Cost | 0 | 218,199 | 236,900 | 225,173 | 215,835 | 202,668 | 189,501 | 167,398 | 154,011 | 154,011 | 154,011 |
| 3. Gross profit (before tax) | 0 | -13,938 | 18,426 | 30,153 | 39,491 | 52,658 | 65,825 | 87,928 | 101,315 | 101,315 | 101,315 |
| 4. Income tax(35%) | 0 | 0 | 6,449 | 10,554 | 13,822 | 18,430 | 23,039 | 30,775 | 35,460 | 35,460 | 35,460 |
| 5. Net profit (after tax) | 0 | -13,938 | 11,977 | 19,600 | 25,669 | 34,228 | 42,786 | 57,153 | 65,855 | 65,855 | 65,855 |
| 6. Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| 7. Undestributed Profit | 0 | -13,938 | 11,977 | 7,430 | 7,414 | 9,888 | 18,446 | 20,643 | 17,175 | 17,175 | 17,175 |
| 8. Accumulated Undestributed Profit | 0 | -13,938 | -1,961 | 5,469 | 12,883 | 22,771 | 41,217 | 61,861 | 79,036 | 96,210 | 113,385 |
| Ratio | | | | | | | | | | | |
| Gross Profit: Sales(%) | --- | -7% | 7% | 12% | 15% | 21% | 26% | 34% | 40% | 40% | 40% |
| Net Profit: Sales(%) | --- | -7% | 5% | 8% | 10% | 13% | 17% | 22% | 26% | 26% | 26% |
| Net Profit: Equity(%) | --- | -11% | 10% | 16% | 21% | 28% | 35% | 47% | 54% | 54% | 54% |

Peso 121,700 .-

SCHEDULE 10 - 11 - INV110

INTERNAL RATE OF RETURN ON INVESTMENT
(Investment Variation 110%)

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 98,202 | 116,903 | 118,343 | 122,172 | 122,172 | 122,172 | 113,236 | 113,236 | 113,236 | 113,236 |
| Gross cash inflow | 0 | 105,059 | 138,423 | 136,983 | 133,154 | 133,154 | 133,154 | 142,090 | 142,090 | 142,090 | 142,090 |
| Income tax(35%) | - | 0 | 6,449 | 10,554 | 13,822 | 18,430 | 23,039 | 30,775 | 35,460 | 35,460 | 35,460 |
| Net cash inflow | 0 | 106,059 | 131,974 | 126,429 | 119,332 | 114,724 | 110,115 | 111,315 | 106,630 | 106,630 | 106,630 |
| Net Present Value(21%) | | 87,647 | 90,138 | 71,369 | 55,668 | 44,226 | 35,083 | 29,309 | 23,203 | 19,172 | 15,845 |
| | | | | | | | | | | N.P.V. Total = | 471,660 |
| Reclaim | | | | | | | | | | | 42,119 |
| | | | | | | | | | | N.P.V.: | 6,259 |

Investment Peso510,070.-

IRROI : Before tax : 22.47%
IRROI : After tax : 19.08%

SCHEDULE 10 - 12 - INV110

## INTERNAL RATE OF RETURN ON EQUITY

(Investment Variation 110%)

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cash Inflow** | | | | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| **Cash outflow** | | | | | | | | | | | |
| b) Operation cost | 0 | 98,202 | 116,903 | 118,343 | 122,172 | 122,172 | 122,172 | 113,236 | 113,236 | 113,236 | 113,236 |
| c) Interest | --- | 79,002 | 79,002 | 65,835 | 52,668 | 39,501 | 26,334 | 13,167 | 0 | 0 | 0 |
| d) Repayment | - | - | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 0 | 0 | 0 |
| Total (b+c+d) | 0 | 177,204 | 252,905 | 241,178 | 231,840 | 218,673 | 205,506 | 183,403 | 113,236 | 113,236 | 113,236 |
| Net cash inflow | 0 | 27,057 | 2,421 | 14,148 | 23,486 | 36,653 | 49,820 | 71,923 | 142,090 | 142,090 | 142,090 |
| Income tax(35%) | - | 0 | 6,449 | 10,554 | 13,822 | 18,430 | 23,039 | 30,775 | 35,460 | 35,460 | 35,460 |
| Retained cash | 0 | 27,057 | -4,028 | 3,594 | 9,664 | 18,223 | 26,781 | 41,148 | 106,630 | 106,630 | 106,630 |
| Net Present Value(21%) | | 22,360 | -2,751 | 2,029 | 4,508 | 7,025 | 8,532 | 10,834 | 23,203 | 19,172 | 15,845 |
| | | | | | | | | | N.P.V. Total = | | 110,757 |
| Reclaim | | | | | | | | | | | 42,119 |
| | | | | | | | | | | N.P.V.: | 6,259 |
| Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| Retained cash after dividend | 0 | 27,057 | -4,028 | -8,576 | -8,591 | -6,117 | 2,441 | 4,638 | 57,950 | 57,950 | 57,950 |
| Accumulated cash | 0 | 27,057 | 23,029 | 14,453 | 5,862 | -255 | 2,186 | 6,824 | 64,774 | 122,724 | 180,673 |

Equity Peso133,870.-

IRROE : After tax : 18.63%

SCHEDULE 10 - 2 - COS090

PRODUCTION COST (Operation Cost Variation 90%) Unit: Peso1,000

| Period | Construct | Start up | | | | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Raw materials | --- | 62,118 | 77,647 | 77,647 | 77,647 | 77,647 | 77,647 | 77,647 | 77,647 | 77,647 | 77,647 |
| Utilities | --- | 8,437 | 8,437 | 8,437 | 8,437 | 8,437 | 8,437 | 8,437 | 8,437 | 8,437 | 8,437 |
| Personal | --- | 2,573 | 2,573 | 2,573 | 2,573 | 2,573 | 2,573 | 2,573 | 2,573 | 2,573 | 2,573 |
| Spare parts | --- | 1,296 | 2,161 | 3,457 | 3,457 | 3,457 | 3,457 | 3,457 | 3,457 | 3,457 | 3,457 |
| Maintenance | --- | 1,008 | 1,008 | 1,008 | 1,008 | 1,008 | 1,008 | 1,008 | 1,008 | 1,008 | 1,008 |
| Technical fee | --- | 5,388 | 4,596 | 4,596 | 8,042 | 8,042 | 8,042 | 0 | 0 | 0 | 0 |
| Factory over head | --- | 1,019 | 1,019 | 1,019 | 1,019 | 1,019 | 1,019 | 1,019 | 1,019 | 1,019 | 1,019 |
| Factory cost | 0 | 81,839 | 97,440 | 98,736 | 102,182 | 102,182 | 102,182 | 94,140 | 94,140 | 94,140 | 94,140 |
| Administrative over head | --- | 1,523 | 1,523 | 1,523 | 1,523 | 1,523 | 1,523 | 1,523 | 1,523 | 1,523 | 1,523 |
| Sales & Distribution | --- | 4,919 | 6,149 | 6,149 | 6,149 | 6,149 | 6,149 | 6,149 | 6,149 | 6,149 | 6,149 |
| Operation cost | | 88,281 | 105,112 | 106,408 | 109,854 | 109,854 | 109,854 | 101,812 | 101,812 | 101,812 | 101,812 |
| Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | 0 | 0 | 0 |
| Depreciation | --- | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,068 | 37,068 | 37,068 |
| Total Production cost | 0 | 197,369 | 214,200 | 203,526 | 195,002 | 183,032 | 171,062 | 151,050 | 138,880 | 138,880 | 138,880 |

SCHEDULE 10 - 9 - COS090

NET INCOME STATEMENT (Operation Cost Variation 90%) Unit: Peso1,000

| Period | Construct | Start up | | | | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 1. Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| 2. Production Cost | 0 | 197,369 | 214,200 | 203,526 | 195,002 | 183,032 | 171,062 | 151,050 | 138,880 | 138,880 | 138,880 |
| 3. Gross profit (before tax) | 0 | 6,892 | 41,126 | 51,800 | 60,324 | 72,294 | 84,264 | 104,276 | 116,446 | 116,446 | 116,446 |
| 4. Income tax(35%) | 0 | 2,412 | 14,394 | 18,130 | 21,113 | 25,303 | 29,492 | 36,497 | 40,756 | 40,756 | 40,756 |
| 5. Net profit (after tax) | 0 | 4,480 | 26,732 | 33,670 | 39,211 | 46,991 | 54,772 | 67,780 | 75,690 | 75,690 | 75,690 |
| 6. Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| 7. Undestributed Profit | 0 | 4,480 | 26,732 | 21,500 | 20,956 | 22,651 | 30,432 | 31,270 | 27,010 | 27,010 | 27,010 |
| 8. Accumulated Undestributed Profit | 0 | 4,480 | 31,212 | 52,712 | 73,667 | 96,319 | 126,750 | 158,020 | 185,030 | 212,040 | 239,050 |
| Ratio | | | | | | | | | | | |
| Gross Profit: Sales(%) | --- | 3% | 16% | 20% | 24% | 28% | 33% | 41% | 46% | 46% | 46% |
| Net Profit: Sales(%) | --- | 2% | 10% | 13% | 15% | 18% | 21% | 27% | 30% | 30% | 30% |
| Net Profit: Equity(%) Peso 121,700 .- | --- | 4% | 22% | 28% | 32% | 39% | 45% | 56% | 62% | 62% | 62% |

SCHEDULE 10 - 11 - COS090

INTERNAL RATE OF RETURN ON INVESTMENT
(Operation Cost Variation 90%)

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 88,281 | 105,112 | 106,408 | 109,854 | 109,854 | 109,854 | 101,812 | 101,812 | 101,812 | 101,812 |
| Gross cash inflow | 0 | 115,980 | 150,214 | 148,918 | 145,472 | 145,472 | 145,472 | 153,514 | 153,514 | 153,514 | 153,514 |
| Income tax(35%) | - | 2,412 | 14,394 | 18,130 | 21,113 | 25,303 | 29,492 | 36,497 | 40,756 | 40,756 | 40,756 |
| Net cash inflow | 0 | 113,568 | 135,820 | 130,788 | 124,359 | 120,169 | 115,980 | 117,018 | 112,758 | 112,758 | 112,758 |
| Net Present Value(21%) | | 93,852 | 92,765 | 73,830 | 58,013 | 46,325 | 36,951 | 30,811 | 24,536 | 20,274 | 16,756 |
| | | | | | | | | | N.P.V. Total = | | 494,113 |
| Reclaim | | | | | | | | | | | 38,290 |
| | | | | | | | | | | N.P.V.: | 5,690 |

Investment Peso463,700.-

IRROI : Before tax : 28.05%
IRROI : After tax : 23.32%

## SCHEDULE 10 - 12 - COS090

### INTERNAL RATE OF RETURN ON EQUITY
(Operation Cost Variation 90%)

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cash Inflow** | | | | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| **Cash outflow** | | | | | | | | | | | |
| b)-Operation cost | 0 | 88,281 | 105,112 | 106,408 | 109,854 | 109,854 | 109,854 | 101,812 | 101,812 | 101,812 | 101,812 |
| c) Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | 0 | 0 | 0 |
| d) Repayment | - | - | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 0 | 0 | 0 |
| Total (b+c+d) | 0 | 160,101 | 233,932 | 223,258 | 214,734 | 202,764 | 190,794 | 170,782 | 101,812 | 101,812 | 101,812 |
| Net cash inflow | 0 | 44,160 | 21,394 | 32,068 | 40,592 | 52,562 | 64,532 | 84,544 | 153,514 | 153,514 | 153,514 |
| Income tax(35%) | - | 2,412 | 14,394 | 18,130 | 21,113 | 25,303 | 29,492 | 36,497 | 40,756 | 40,756 | 40,756 |
| Retained cash | 0 | 41,748 | 7,000 | 13,938 | 19,479 | 27,259 | 35,040 | 48,048 | 112,758 | 112,758 | 112,758 |
| Net Present Value(21%) | | 34,500 | 4,781 | 7,868 | 9,087 | 10,508 | 11,164 | 12,651 | 24,536 | 20,274 | 16,756 |
| | | | | | | | | | N.P.V. Total = | | 152,125 |
| Reclaim | | | | | | | | | | | 38,290 |
| | | | | | | | | | | N.P.V.: | 5,690 |
| Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| Retained cash after dividend | 0 | 41,748 | 7,000 | 1,768 | 1,224 | 2,919 | 10,700 | 11,538 | 64,078 | 64,078 | 64,078 |
| Accumulated cash | 0 | 41,748 | 48,748 | 50,516 | 51,739 | 54,659 | 65,358 | 76,896 | 140,974 | 205,052 | 269,130 |

Equity Peso121,700.-

IRROE : After tax : 26.81%

SCHEDULE 10 - 2 - COS110

PRODUCTION COST (Operation Cost Variation 110%) Unit: Peso1,000

| Period | Construct | Start up | | | | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Raw materials | --- | 75,922 | 94,901 | 94,901 | 94,901 | 94,901 | 94,901 | 94,901 | 94,901 | 94,901 | 94,901 |
| Utilities | --- | 10,311 | 10,311 | 10,311 | 10,311 | 10,311 | 10,311 | 10,311 | 10,311 | 10,311 | 10,311 |
| Personal | --- | 3,145 | 3,145 | 3,145 | 3,145 | 3,145 | 3,145 | 3,145 | 3,145 | 3,145 | 3,145 |
| Spare parts | --- | 1,584 | 2,641 | 4,225 | 4,225 | 4,225 | 4,225 | 4,225 | 4,225 | 4,225 | 4,225 |
| Maintenance | --- | 1,232 | 1,232 | 1,232 | 1,232 | 1,232 | 1,232 | 1,232 | 1,232 | 1,232 | 1,232 |
| Technical fee | --- | 6,586 | 5,618 | 5,618 | 9,830 | 9,830 | 9,830 | 0 | 0 | 0 | 0 |
| Factory over head | --- | 1,245 | 1,245 | 1,245 | 1,245 | 1,245 | 1,245 | 1,245 | 1,245 | 1,245 | 1,245 |
| Factory cost | 0 | 100,025 | 119,094 | 120,678 | 124,890 | 124,890 | 124,890 | 115,060 | 115,060 | 115,060 | 115,060 |
| Administrative over head | --- | 1,861 | 1,861 | 1,861 | 1,861 | 1,861 | 1,861 | 1,861 | 1,861 | 1,861 | 1,861 |
| Sales & Distribution | --- | 6,013 | 7,515 | 7,515 | 7,515 | 7,515 | 7,515 | 7,515 | 7,515 | 7,515 | 7,515 |
| Operation cost | | 107,899 | 128,470 | 130,054 | 134,266 | 134,266 | 134,266 | 124,436 | 124,436 | 124,436 | 124,436 |
| Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | 0 | 0 | 0 |
| Depreciation | --- | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,068 | 37,068 | 37,068 |
| Total Production cost | 0 | 216,987 | 237,558 | 227,172 | 219,414 | 207,444 | 195,474 | 173,674 | 161,504 | 161,504 | 161,504 |

SCHEDULE 10 - 9 - COS110

NET INCOME STATEMENT (Operation Cost Variation 110%) Unit: Peso1,000

| Period | Construct | Start up | | | | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 1. Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| 2. Production Cost | 0 | 216,987 | 237,558 | 227,172 | 219,414 | 207,444 | 195,474 | 173,674 | 161,504 | 161,504 | 161,504 |
| 3. Gross profit (before tax) | 0 | -12,726 | 17,768 | 28,154 | 35,912 | 47,882 | 59,852 | 81,652 | 93,822 | 93,822 | 93,822 |
| 4. Income tax(35%) | 0 | 0 | 6,219 | 9,854 | 12,569 | 16,759 | 20,940 | 28,578 | 32,838 | 32,838 | 32,838 |
| 5. Net profit (after tax) | 0 | -12,726 | 11,549 | 18,300 | 23,343 | 31,123 | 38,904 | 53,074 | 60,984 | 60,984 | 60,984 |
| 6. Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| 7. Undestributed Profit | 0 | -12,726 | 11,549 | 6,130 | 5,088 | 6,783 | 14,564 | 16,564 | 12,304 | 12,304 | 12,304 |
| 8. Accumulated Undestributed Profit | 0 | -12,726 | -1,177 | 4,953 | 10,041 | 16,824 | 31,388 | 47,952 | 60,256 | 72,560 | 84,864 |
| Ratio | | | | | | | | | | | |
| Gross Profit: Sales(%) | --- | -6% | 7% | 11% | 14% | 19% | 23% | 32% | 37% | 37% | 37% |
| Net Profit: Sales(%) | --- | -6% | 5% | 7% | 9% | 12% | 15% | 21% | 24% | 24% | 24% |
| Net Profit: Equity(%) | --- | -10% | 9% | 15% | 19% | 26% | 32% | 44% | 50% | 50% | 50% |

Peso 121,700 .-

SCHEDULE 10 - 11 - COS110

INTERNAL RATE OF RETURN ON INVESTMENT
(Operation Cost Variation 110%)

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 107,899 | 128,470 | 130,054 | 134,266 | 134,266 | 134,266 | 124,436 | 124,436 | 124,436 | 124,436 |
| Gross cash inflow | 0 | 96,362 | 126,856 | 125,272 | 121,060 | 121,060 | 121,060 | 130,890 | 130,890 | 130,890 | 130,890 |
| Income tax(35%) | - | 0 | 6,219 | 9,854 | 12,569 | 16,759 | 20,948 | 28,578 | 32,838 | 32,838 | 32,838 |
| Net cash inflow | 0 | 96,362 | 120,637 | 115,418 | 108,491 | 104,301 | 100,112 | 102,312 | 98,052 | 98,052 | 98,052 |
| Net Present Value(21%) | | 79,634 | 82,395 | 65,153 | 50,611 | 40,208 | 31,896 | 26,939 | 21,336 | 17,630 | 14,571 |
| | | | | | | | | | N.P.V. Total = | | 456,161 |
| Reclaim | | | | | | | | | | | 38,290 |
| | | | | | | | | | N.P.V.: | | 5,690 |

Investment Peso463,700.-

IRROI : Before tax : 22.62%
IRROI : After tax : 19.19%

SCHEDULE 10 - 12 - COS110

INTERNAL RATE OF RETURN ON EQUITY
(Operation Cost Variation 110%)

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 107,899 | 128,470 | 130,054 | 134,266 | 134,266 | 134,266 | 124,436 | 124,436 | 124,436 | 124,436 |
| c) Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | 0 | 0 | 0 |
| d) Repayment | - | - | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 0 | 0 | 0 |
| Total (b+c+d) | 0 | 179,719 | 257,290 | 246,904 | 239,146 | 227,176 | 215,206 | 193,406 | 124,436 | 124,436 | 124,436 |
| Net cash inflow | 0 | 24,542 | -1,964 | 8,422 | 16,180 | 28,150 | 40,120 | 61,920 | 130,890 | 130,890 | 130,890 |
| Income tax(35%) | - | 0 | 6,219 | 9,854 | 12,569 | 16,759 | 20,948 | 28,578 | 32,838 | 32,838 | 32,838 |
| Retained cash | 0 | 24,542 | -8,183 | -1,432 | 3,611 | 11,391 | 19,172 | 33,342 | 98,052 | 98,052 | 98,052 |
| Net Present Value(21%) | | 20,282 | -5,589 | -808 | 1,634 | 4,391 | 6,108 | 8 779 | 21,336 | 17,630 | 14,571 |
| | | | | | | | | | N.P.V. Total = | | 115,611 |
| Reclaim | | | | | | | | | | | 38,290 |
| | | | | | | | | | | N.P.V.: | 5,690 |
| Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| Retained cash after dividend | 0 | 24,542 | -8,183 | -13,602 | -14,644 | -12,949 | -5,168 | -3,168 | 49,372 | 49,372 | 49,372 |
| Accumulated cash | 0 | 24,542 | 16,359 | 2,757 | -11,887 | -24,836 | -30,004 | -33,172 | 16,200 | 65,572 | 114,944 |

Equity Peso121,700.-

IRROE : After tax : 16.77%

SCHEDULE 10 - 16

SHADOW PRICE OF TOTAL INVESTMENT Unit : Peso1,000

| Period Year | Original cost | Conversion ratio | Shadow Price (1) | Foreign Exchange ratio | Shadow Price (2) |
|---|---|---|---|---|---|
| Plant Construction Cost | | | | | |
| Land | 2,290 | 1.0 | 2,290 | - | 2,290 |
| Machinery & Equipment(Import) | 204,872 | 1.0 | 204,872 | 1.5 | 307,308 |
| Machinery & Equipment(Local) | 78,576 | 0.9 | 70,718 | - | 70,718 |
| Vehicle | 1,400 | 1.0 | 1,400 | 1.5 | 2,100 |
| Civil Work | 40,560 | 0.9 | 36,504 | - | 36,504 |
| Erection Work | 13,956 | 0.9 | 12,560 | - | 12,560 |
| Technical Fee (Foreign) | 9,063 | 1.0 | 9,063 | 1.5 | 13,595 |
| Technical Fee (Local) | 1,070 | 1.0 | 1,070 | - | 1,070 |
| Contingencies (Foreign) | 21,065 | 1.0 | 21,065 | 1.5 | 31,598 |
| Contingencies (Local) | 22,148 | 0.9 | 19,933 | - | 19,933 |
| Sub-Total | 395,000 | | 379,475 | | 497,676 |
| Pre-operation Cost | | | | | |
| Foreign currency potion | 4,400 | 1.0 | 4,400 | 1.5 | 6,600 |
| Local currency potion | 28,300 | 1.0 | 28,300 | 1.5 | 42,450 |
| Sub-Total | 32,700 | | 32,700 | | 49,050 |
| Working Capital | | | | | |
| Foreign currency potion | 15,000 | 1.0 | 15,000 | 1.5 | 21,600 |
| Local currency potion | 26,000 | 0.9 | 23,400 | - | 23,400 |
| Sub-Total | 41,000 | | 38,400 | | 45,000 |
| Grand Total | 468,700 | | 450,575 | | 591,726 |

SCHEDULE 10 - 17/1

PRODUCTION COST Unit: Peso1,000

| Period | Start up | | | Full Capacity Year | | | | | | Full Capacity Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | | 2 | | | 3 | | | 4 | | | 5 | |
| Production Program | | 80% | | | 100% | | | 100% | | | 100% | |
| Currency | FC | LC | Total | FC | LC | Total | FC | LC | Total | FC | LC | Total |
| Raw materials | 91,248 | 1,894 | 93,142 | 114,060 | 2,367 | 116,427 | 114,060 | 2,367 | 116,427 | 114,060 | 2,367 | 116,427 |
| Utilities | 0 | 12,577 | 12,577 | 0 | 12,577 | 12,577 | 0 | 12,577 | 12,577 | 0 | 12,577 | 12,577 |
| Personal | 0 | 2,805 | 2,805 | 0 | 2,805 | 2,805 | 0 | 2,805 | 2,805 | 0 | 2,805 | 2,805 |
| Spare parts | 2,060 | 60 | 2,120 | 3,434 | 101 | 3,535 | 5,493 | 161 | 5,654 | 5,493 | 161 | 5,654 |
| Maintenance | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 |
| Technical fee | 8,891 | 60 | 8,951 | 7,661 | 0 | 7,661 | 7,661 | 0 | 7,661 | 13,404 | 0 | 13,404 |
| Factory over head | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 |
| Factory cost | | | 121,847 | | | 145,257 | | | 147,376 | | | 153,119 |
| Administrative over head | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 |
| Sales & Distribution | 0 | 5,460 | 5,460 | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 |
| Operation cost | | | 128,999 | | | 153,781 | | | 155,900 | | | 161,643 |
| Interest | 0 | 97,655 | 97,655 | 0 | 97,656 | 97,656 | 0 | 81,380 | 81,380 | 0 | 65,104 | 65,104 |
| Depreciation | 0 | 47,768 | 47,768 | 0 | 47,768 | 47,768 | 0 | 47,768 | 47,768 | 0 | 47,768 | 47,768 |
| Total Production cost | | | 274,422 | | | 299,205 | | | 285,048 | | | 274,515 |

SCHEDULE 10 - 17/2

PRODUCTION COST

| Period | Full Capacity Year | | | | | | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | | 6 | | | 7 | | | 8 | | | 9-11 | |
| Production Program | | 100% | | | 100% | | | 100% | | | 100% | |
| Currency | FC | LC | Total | FC | LC | Total | FC | LC | Total | FC | LC | Total |
| Raw materials | 114,060 | 2,367 | 116,427 | 114,060 | 2,367 | 116,427 | 114,060 | 2,367 | 116,427 | 114,060 | 2,367 | 116,427 |
| Utilities | 0 | 12,577 | 12,577 | 0 | 12,577 | 12,577 | 0 | 12,577 | 12,577 | 0 | 12,577 | 12,577 |
| Personal | 0 | 2,805 | 2,805 | 0 | 2,805 | 2,805 | 0 | 2,805 | 2,805 | 0 | 2,805 | 2,805 |
| Spare parts | 5,493 | 161 | 5,654 | 5,493 | 161 | 5,654 | 5,493 | 161 | 5,654 | 5,493 | 161 | 5,654 |
| Maintenance | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 | 0 | 1,120 | 1,120 |
| Technical fee | 13,404 | 0 | 13,404 | 13,404 | 0 | 13,404 | 13,404 | 0 | 13,404 | 13,404 | 0 | 13,404 |
| Factory over head | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 | 0 | 1,132 | 1,132 |
| Factory cost | | | 153,119 | | | 153,119 | | | 153,119 | | | 153,119 |
| Administrative over head | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 | 0 | 1,692 | 1,692 |
| Sales & Distribution | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 | 0 | 6,832 | 6,832 |
| Operation cost | | | 161,643 | | | 161,643 | | | 161,643 | | | 161,643 |
| Interest | 0 | 48,828 | 48,828 | 0 | 32,552 | 32,552 | 0 | 16,277 | 16,277 | 0 | 0 | 0 |
| Depreciation | 0 | 47,768 | 47,768 | 0 | 47,768 | 47,768 | 0 | 47,768 | 47,768 | 0 | 47,468 | 47,468 |
| Total Production cost | | | 258,239 | | | 241,963 | | | 225,688 | | | 209,111 |

SCHEDULE 10 - 18

NET INCOME STATEMENT

Unit: Peso1,000

| Period | Construc | Start up | Full Capacity Year | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 1. Sales revenue | 0 | 278,538 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 |
| 2. Production Cost | 0 | 274,422 | 299,205 | 285,048 | 274,515 | 258,239 | 241,963 | 225,688 | 209,111 | 209,111 | 209,111 |
| 3. Gross profit (before tax) | | 4,116 | 48,967 | 63,124 | 73,657 | 89,933 | 106,209 | 122,484 | 139,061 | 139,061 | 139,061 |
| 4. Income tax(35%) | 0 | 1,441 | 17,138 | 22,093 | 25,780 | 31,477 | 37,173 | 42,869 | 48,671 | 48,671 | 48,671 |
| 5. Net profit (after tax) | 0 | 2,675 | 31,829 | 41,031 | 47,877 | 58,456 | 69,036 | 79,615 | 90,390 | 90,390 | 90,390 |
| 6. Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| 7. Undestributed Profit | 0 | 2,675 | 31,829 | 28,861 | 29,622 | 34,116 | 44,696 | 43,105 | 41,710 | 41,710 | 41,710 |
| 8. Accumulated Undestributed Profit | 0 | 2,675 | 34,504 | 63,365 | 92,987 | 127,103 | 171,799 | 214,904 | 256,613 | 298,323 | 340,032 |
| Ratio | | | | | | | | | | | |
| Gross Profit: Sales(%) | --- | 1% | 14% | 18% | 21% | 26% | 31% | 35% | 40% | 40% | 40% |
| Net Profit: Sales(%) | --- | 1% | 9% | 12% | 14% | 17% | 20% | 23% | 26% | 26% | 26% |
| Net Profit: Equity(%) | --- | 2% | 26% | 34% | 39% | 48% | 57% | 65% | 74% | 74% | 74% |
| Peso 121,700 .- | | | | | | | | | | | |

SCHEDULE 10 - 19

INTERNAL RATE OF RETURN ON INVESTMENT

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 278,538 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 128,999 | 153,781 | 155,900 | 161,643 | 161,643 | 161,643 | 161,643 | 161,643 | 161,643 | 161,643 |
| Gross cash inflow | 0 | 149,539 | 194,391 | 192,272 | 186,529 | 186,529 | 186,529 | 186,529 | 186,529 | 186,529 | 186,529 |
| Income tax(35%) | - | 1,441 | 17,138 | 22,093 | 25,780 | 31,477 | 37,173 | 42,869 | 48,671 | 48,671 | 48,671 |
| Net cash inflow | 0 | 148,098 | 177,253 | 170,179 | 160,749 | 155,052 | 149,356 | 143,660 | 137,858 | 137,858 | 137,858 |
| Net Present Value(21%) | | 122,389 | 121,063 | 96,066 | 74,989 | 59,773 | 47,585 | 37,826 | 29,998 | 24,787 | 20,486 |
| | | | | | | | | | N.P.V. Total = | | 634,962 |
| Reclaim | | | | | | | | | | | 38,290 |
| | | | | | | | | | | N.P.V.: | 5,690 |

Investment Peso587,226.-

IRROI : Before tax : 28.25%
IRROI : After tax : 23.76%

## SCHEDULE 10 - 20

## INTERNAL RATE OF RETURN ON EQUITY

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 278,538 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 | 348,172 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 128,999 | 153,781 | 155,900 | 161,643 | 161,643 | 161,643 | 161,643 | 161,643 | 161,643 | 161,643 |
| c) Interest | 0 | 97,655 | 97,656 | 81,380 | 65,104 | 48,828 | 32,552 | 16,277 | 0 | 0 | 0 |
| d) Repayment | - | - | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 0 | 0 | 0 |
| Total (b+c+d) | 0 | 226,654 | 308,437 | 294,280 | 283,747 | 267,471 | 251,195 | 234,920 | 161,643 | 161,643 | 161,643 |
| Net cash inflow | 0 | 51,884 | 39,735 | 53,892 | 64,425 | 80,701 | 96,977 | 113,252 | 186,529 | 186,529 | 186,529 |
| Income tax(35%) | - | 1,441 | 17,138 | 22,093 | 25,780 | 31,477 | 37,173 | 42,869 | 48,671 | 48,671 | 48,671 |
| Retained cash | 0 | 50,443 | 22,597 | 31,799 | 38,645 | 49,224 | 59,804 | 70,383 | 137,858 | 137,858 | 137,858 |
| Net Present Value(21%) | | 41,686 | 15,433 | 17,950 | 18,028 | 18,976 | 19,054 | 18,532 | 29,998 | 24,787 | 20,486 |
| | | | | | | | | | | N.P.V. Total = | 224,930 |
| Reclaim | | | | | | | | | | | 38,290 |
| | | | | | | | | | | N.P.V.: | 5,690 |
| Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| Retained cash after dividend | 0 | 50,443 | 22,597 | 19,629 | 20,390 | 24,884 | 35,464 | 33,873 | 89,178 | 89,178 | 89,178 |
| Accumulated cash | 0 | 50,443 | 73,040 | 92,669 | 113,059 | 137,943 | 173,407 | 207,280 | 296,457 | 385,635 | 474,812 |

Equity Peso121,700.-

IRROE : After tax : 38.12%

SCHEDULE 10 - 21 - 1

PRODUCTION COST

Unit: Peso1,000

| Period | Construct | Start up | | | | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Raw materials | --- | 69,020 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 |
| Utilities | --- | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 |
| Personal | --- | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 |
| Spare parts | --- | 1,440 | 2,401 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 |
| Maintenance | --- | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 |
| Technical fee | --- | 5,987 | 5,107 | 5,107 | 8,936 | 8,936 | 8,936 | 0 | 0 | 0 | 0 |
| Factory over head | --- | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 |
| Factory cost | 0 | 90,932 | 108,267 | 109,707 | 113,536 | 113,536 | 113,536 | 104,600 | 104,600 | 104,600 | 104,600 |
| Administrative over head | --- | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 |
| Sales & Distribution | --- | 5,466 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 |
| Operation cost | | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| Interest | --- | 57,240 | 57,240 | 47,700 | 38,160 | 28,620 | 19,080 | 9,540 | 0 | 0 | 0 |
| Depreciation | --- | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,068 | 37,068 | 37,068 |
| Total Production cost | 0 | 192,598 | 211,299 | 203,199 | 197,488 | 187,948 | 178,408 | 159,932 | 150,192 | 150,192 | 150,192 |

SCHEDULE 10 - 21 - 2

NET INCOME STATEMENT Unit: Peso1,000

| Period | Construct | Start up | Full Capacity Year | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 1. Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| 2. Production Cost | 0 | 192,598 | 211,299 | 203,199 | 197,488 | 187,948 | 178,408 | 159,932 | 150,192 | 150,192 | 150,192 |
| 3. Pre-operating cost | 32,700 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3. Gross profit (before tax) | -32,700 | 11,663 | 44,027 | 52,127 | 57,838 | 67,378 | 76,918 | 95,394 | 105,134 | 105,134 | 105,134 |
| 4. Income tax(35%) | 0 | 0 | 15,409 | 18,244 | 20,243 | 23,582 | 26,921 | 33,388 | 36,797 | 36,797 | 36,797 |
| 5. Net profit (after tax) | -32,700 | 11,663 | 28,618 | 33,883 | 37,595 | 43,796 | 49,997 | 62,006 | 68,337 | 68,337 | 68,337 |
| 6. Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| 7. Undestributed Profit | -32,700 | 11,663 | 28,618 | 21,713 | 19,340 | 19,456 | 25,657 | 25,496 | 19,657 | 19,657 | 19,657 |
| 8. Accumulated Undestributed Profit | -32,700 | -21,037 | 7,581 | 29,293 | 48,633 | 68,089 | 93,745 | 119,241 | 138,898 | 158,556 | 178,213 |
| Ratio | | | | | | | | | | | |
| Gross Profit: Sales(%) | --- | 6% | 17% | 20% | 23% | 26% | 30% | 37% | 41% | 41% | 41% |
| Net Profit: Sales(%) | --- | 6% | 11% | 13% | 15% | 17% | 20% | 24% | 27% | 27% | 27% |
| Net Profit: Equity(%) | --- | 10% | 24% | 28% | 31% | 36% | 41% | 51% | 56% | 56% | 56% |
| Peso | 121,700 .- | | | | | | | | | | |

SCHEDULE 10 - 21 - 3

INTERNAL RATE OF RETURN ON INVESTMENT

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| Gross cash inflow | 0 | 106,171 | 138,535 | 137,095 | 133,266 | 133,266 | 133,266 | 142,202 | 142,202 | 142,202 | 142,202 |
| Income tax(35%) | - | 0 | 15,409 | 18,244 | 20,243 | 23,582 | 26,921 | 33,388 | 36,797 | 36,797 | 36,797 |
| Net cash inflow | 0 | 106,171 | 123,126 | 118,851 | 113,023 | 109,684 | 106,345 | 108,814 | 105,405 | 105,405 | 105,405 |
| Reclaim | | | | | | | | | | | 38,290 |

Investment Peso463,700.-

IRROI : Before tax : 25.36%
IRROI : After tax : 21.34%

SCHEDULE 10 - 21 - 4

INTERNAL RATE OF RETURN ON EQUITY

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| c) Interest | --- | 57,240 | 57,240 | 47,700 | 38,160 | 28,620 | 19,080 | 9,540 | 0 | 0 | 0 |
| d) Repayment | - | - | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 0 | 0 | 0 |
| Total (b+c+d) | 0 | 155,330 | 231,031 | 222,931 | 217,220 | 207,680 | 198,140 | 179,664 | 113,124 | 113,124 | 113,124 |
| Net cash inflow | C | 48,931 | 24,295 | 32,395 | 38,106 | 47,646 | 57,186 | 75,662 | 142,202 | 142,202 | 142,202 |
| Income tax(35%) | - | 0 | 15,409 | 18,244 | 20,243 | 23,582 | 26,921 | 33,388 | 36,797 | 36,797 | 36,797 |
| Retained cash | 0 | 48,931 | 8,886 | 14,151 | 17,863 | 24,064 | 30,265 | 42,274 | 105,405 | 105,405 | 105,405 |
| Reclaim | | | | | | | | | | | 38,290 |

Equity Peso121,700.-

IRROE : After tax : 26.90%

SCHEDULE 10 - 22 - 1

PRODUCTION COST

Unit: Pesol,000

| Period | Construct | Start up | Full Capacity Year | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Raw materials | --- | 72,471 | 95,117 | 99,873 | 104,867 | 110,110 | 115,616 | 121,397 | 127,467 | 133,840 | 140,532 |
| Utilities | --- | 10,030 | 10,732 | 11,483 | 12,287 | 13,147 | 14,067 | 15,052 | 16,106 | 17,233 | 18,439 |
| Personal | --- | 3,145 | 3,459 | 3,805 | 4,186 | 4,605 | 5,066 | 5,573 | 6,130 | 6,743 | 7,417 |
| Spare parts | --- | 1,512 | 2,647 | 2,779 | 2,918 | 3,064 | 3,217 | 3,378 | 3,547 | 3,724 | 3,910 |
| Maintenance | --- | 1,198 | 1,282 | 1,372 | 1,468 | 1,571 | 1,681 | 1,799 | 1,925 | 2,060 | 2,204 |
| Technical fee | --- | 6,286 | 5,846 | 6,256 | 11,714 | 12,534 | 13,411 | 0 | 0 | 0 | 0 |
| Factory over head | --- | 1,211 | 1,296 | 1,387 | 1,484 | 1,588 | 1,699 | 1,818 | 1,945 | 2,081 | 2,227 |
| Factory cost | 0 | 95,853 | 120,379 | 126,955 | 138,924 | 146,619 | 154,757 | 149,017 | 157,120 | 165,681 | 174,729 |
| Administrative over head | --- | 1,810 | 1,937 | 2,073 | 2,218 | 2,373 | 2,539 | 2,717 | 2,907 | 3,110 | 3,328 |
| Sales & Distribution | --- | 5,849 | 7,822 | 8,370 | 8,956 | 9,583 | 10,254 | 10,972 | 11,740 | 12,562 | 13,441 |
| Operation cost | | 103,512 | 130,138 | 137,398 | 150,098 | 158,575 | 167,550 | 162,706 | 171,767 | 181,353 | 191,498 |
| Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | 0 | 0 | 0 |
| Depreciation | --- | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,068 | 37,068 | 37,068 |
| Total Production cost | 0 | 212,600 | 239,226 | 234,516 | 235,246 | 231,753 | 228,758 | 211,944 | 208,835 | 218,421 | 228,566 |

SCHEDULE 10 - 22 - 2

NET INCOME STATEMENT

Unit: Peso1,000

| Period | Construct | Start up | | | | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 1. Sales revenue | 0 | 218,559 | 292,323 | 312,786 | 334,681 | 358,109 | 383,177 | 409,999 | 438,699 | 469,408 | 502,267 |
| 2. Production Cost | 0 | 212,600 | 239,226 | 234,516 | 235,246 | 231,753 | 228,758 | 211,944 | 208,835 | 218,421 | 228,566 |
| 3. Pre-operating cost | 32,700 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3. Gross profit (before tax) | -32,700 | 5,959 | 53,097 | 78,270 | 99,435 | 126,356 | 154,419 | 198,055 | 229,864 | 250,987 | 273,701 |
| 4. Income tax(35%) | 0 | 0 | 18,584 | 27,395 | 34,802 | 44,225 | 54,047 | 69,319 | 80,452 | 87,845 | 95,795 |
| 5. Net profit (after tax) | -32,700 | 5,959 | 34,513 | 50,876 | 64,633 | 82,131 | 100,372 | 128,736 | 149,412 | 163,142 | 177,906 |
| 6. Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 | 48,680 | 48,680 | 48,680 |
| 7. Undestributed Profit | -32,700 | 5,959 | 34,513 | 38,706 | 46,378 | 57,791 | 76,032 | 92,226 | 100,732 | 114,462 | 129,226 |
| 8. Accumulated Undestributed Profit | -32,700 | -26,741 | 7,772 | 46,478 | 92,855 | 150,647 | 226,679 | 318,905 | 419,636 | 534,098 | 663,324 |
| Ratio | | | | | | | | | | | |
| Gross Profit: Sales(%) | --- | 3% | 18% | 25% | 30% | 35% | 40% | 48% | 52% | 53% | 54% |
| Net Profit: Sales(%) | --- | 3% | 12% | 16% | 19% | 23% | 26% | 31% | 34% | 35% | 35% |
| Net Profit: Equity(%) | --- | 5% | 28% | 42% | 53% | 67% | 82% | 106% | 123% | 134% | 146% |
| Peso | 121,700 .- | | | | | | | | | | |

SCHEDULE 10 - 22 - 3

INTERNAL RATE OF RETURN ON INVESTMENT

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 218,559 | 292,323 | 312,786 | 334,681 | 358,109 | 383,177 | 409,999 | 438,699 | 469,408 | 502,267 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 103,512 | 130,138 | 137,398 | 150,098 | 158,575 | 167,550 | 162,706 | 171,767 | 181,353 | 191,498 |
| Gross cash inflow | 0 | 115,047 | 162,185 | 175,388 | 184,583 | 199,534 | 215,627 | 247,293 | 266,932 | 288,055 | 310,769 |
| Income tax(35%) | - | 0 | 18,584 | 27,395 | 34,802 | 44,225 | 54,047 | 69,319 | 80,452 | 87,845 | 95,795 |
| Net cash inflow | 0 | 115,047 | 143,601 | 147,994 | 149,781 | 155,309 | 161,580 | 177,974 | 186,480 | 200,210 | 214,974 |
| Reclaim | | | | | | | | | | | 38,290 |

Investment Peso463,700.-

IRROI : Before tax : 35.63%
IRROI : After tax : 29.53%

SCHEDULE 10 - 22 - 4

INTERNAL RATE OF RETURN ON EQUITY

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 218,559 | 292,323 | 312,786 | 334,681 | 358,109 | 383,177 | 409,999 | 438,699 | 469,408 | 502,267 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 103,512 | 130,138 | 137,398 | 150,098 | 158,575 | 167,550 | 162,706 | 171,767 | 181,353 | 191,498 |
| c) Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 | 0 | 0 | 0 |
| d) Repayment | - | - | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 0 | 0 | 0 |
| Total (b+c+d) | 0 | 175,332 | 258,958 | 254,248 | 254,978 | 251,485 | 248,490 | 231,676 | 171,767 | 181,353 | 191,498 |
| Net cash inflow | 0 | 43,227 | 33,365 | 58,538 | 79,703 | 106,624 | 134,687 | 178,323 | 266,932 | 288,055 | 310,769 |
| Income tax(35%) | - | 0 | 18,584 | 27,395 | 34,802 | 44,225 | 54,047 | 69,319 | 80,452 | 87,845 | 95,795 |
| Retained cash | 0 | 43,227 | 14,781 | 31,144 | 44,901 | 62,399 | 80,640 | 109,004 | 186,480 | 200,210 | 214,974 |
| Reclaim | | | | | | | | | | | 38,290 |

Equity Peso121,700.-

IRROE : After tax : 40.84%

SCHEDULE 10 - 23 - 1

PRODUCTION COST

Unit: Peso1,000

| Period | Construct | Start up | | | | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Raw materials | --- | 69,020 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 |
| Utilities | --- | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 |
| Personal | --- | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,359 | 2,859 |
| Spare parts | --- | 1,440 | 2,401 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 |
| Maintenance | --- | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 |
| Technical fee | --- | 5,987 | 5,107 | 5,107 | 8,936 | 8,936 | 8,936 | 0 | 0 | 0 | 0 |
| Factory over head | --- | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 |
| Factory cost | 0 | 90,932 | 108,267 | 109,707 | 113,536 | 113,536 | 113,536 | 104,600 | 104,600 | 104,600 | 104,600 |
| Administrative over head | --- | 1,692 | 1,692 | 1,592 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 |
| Sales & Distribution | --- | 5,466 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 |
| Operation cost | | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| Interest | --- | 59,220 | 59,220 | 49,350 | 39,480 | 29,610 | 19,740 | 9,870 | 0 | 0 | 0 |
| Depreciation | --- | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,068 | 37,068 | 37,068 |
| Total Production cost | 0 | 194,578 | 213,279 | 204,849 | 198,808 | 188,938 | 179,068 | 160,262 | 150,192 | 150,192 | 150,192 |

SCHEDULE 10 - 23 - 2

NET INCOME STATEMENT Unit: Peso1,000

| Period | Construct | Start up | | | | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 1. Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| 2. Production Cost | 0 | 194,578 | 213,279 | 204,849 | 198,808 | 188,938 | 179,068 | 160,262 | 150,192 | 150,192 | 150,192 |
| 3. Pre-operating cost | 32,700 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3. Gross profit (before tax) | -32,700 | 9,683 | 42,047 | 50,477 | 56,518 | 66,388 | 76,258 | 95,064 | 105,134 | 105,134 | 105,134 |
| 4. Income tax(35%) | 0 | 0 | 14,716 | 17,667 | 19,781 | 23,236 | 26,690 | 33,272 | 36,797 | 36,797 | 36,797 |
| 5. Net profit (after tax) | -32,700 | 9,683 | 27,331 | 32,810 | 36,737 | 43,152 | 49,568 | 61,792 | 68,337 | 68,337 | 68,337 |
| 6. Dividend | 0 | 0 | 0 | 18,170 | 27,255 | 36,340 | 36,340 | 54,510 | 72,680 | 72,680 | 72,680 |
| 7. Undestributed Profit | -32,700 | 9,683 | 27,331 | 14,640 | 9,482 | 6,812 | 13,228 | 7,282 | -4,343 | -4,343 | -4,343 |
| 8. Accumulated Undestributed Profit | -32,700 | -23,017 | 4,314 | 18,954 | 28,435 | 35,248 | 48,475 | 55,757 | 51,414 | 47,071 | 42,728 |
| Ratio | | | | | | | | | | | |
| Gross Profit: Sales(%) | --- | 5% | 16% | 20% | 2[illegible]% | 26% | 30% | 37% | 41% | 41% | 41% |
| Net Profit: Sales(%) | --- | 5% | 11% | 13% | 14% | 17% | 19% | 24% | 27% | 27% | 27% |
| Net Profit: Equity(%) | --- | 5% | 15% | 18% | 20% | 24% | 27% | 34% | 38% | 38% | 38% |
| Peso | 181,700 .- | | | | | | | | | | |

SCHEDULE 10 - 23 - 3

INTERNAL RATE OF RETURN ON INVESTMENT

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| Gross cash inflow | 0 | 106,171 | 138,535 | 137,095 | 133,266 | 133,266 | 133,266 | 142,202 | 142,202 | 142,202 | 142,202 |
| Income tax(35%) | - | 0 | 14,716 | 17,667 | 19,781 | 23,236 | 26,690 | 33,272 | 36,797 | 36,797 | 36,797 |
| Net cash inflow | 0 | 106,171 | 123,819 | 119,428 | 113,485 | 110,030 | 106,576 | 108,930 | 105,405 | 105,405 | 105,405 |
| Reclaim | | | | | | | | | | | 38,290 |

Investment Peso463,700.-

IRROI : Before tax : 25.36%
IRROI : After tax : 21.34%

SCHEDULE 10 - 23 - 4

INTERNAL RATE OF RETURN ON EQUITY

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| - Cash outflow | | | | | | | | | | | |
| b) Operation cost | 0 | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 | 113,124 | 113,124 | 113,124 |
| c) Interest | --- | 59,220 | 59,220 | 49,350 | 39,480 | 29,610 | 19,740 | 9,870 | 0 | 0 | 0 |
| d) Repayment | - | - | 47,000 | 47,000 | 47,000 | 47,000 | 47,000 | 47,000 | 0 | 0 | 0 |
| Total (b+c+d) | 0 | 157,310 | 223,011 | 214,581 | 208,540 | 198,670 | 188,800 | 169,994 | 113,124 | 113,124 | 113,124 |
| Net cash inflow | 0 | 46,951 | 32,315 | 40,745 | 46,786 | 56,656 | 66,526 | 85,332 | 142,202 | 142,202 | 142,202 |
| Income tax(35%) | - | 0 | 14,716 | 17,667 | 19,781 | 23,236 | 26,690 | 33,272 | 36,797 | 36,797 | 36,797 |
| Retained cash | 0 | 46,951 | 17,599 | 23,078 | 27,005 | 33,420 | 39,836 | 52,060 | 105,405 | 105,405 | 105,405 |
| Reclaim | | | | | | | | | | | 38,290 |

Equity Peso181,700.-

IRROE : After tax : 20.66%

FIG. 10-1 IRROI AFTER TAX

(SENSITIVITY ANALYSIS)

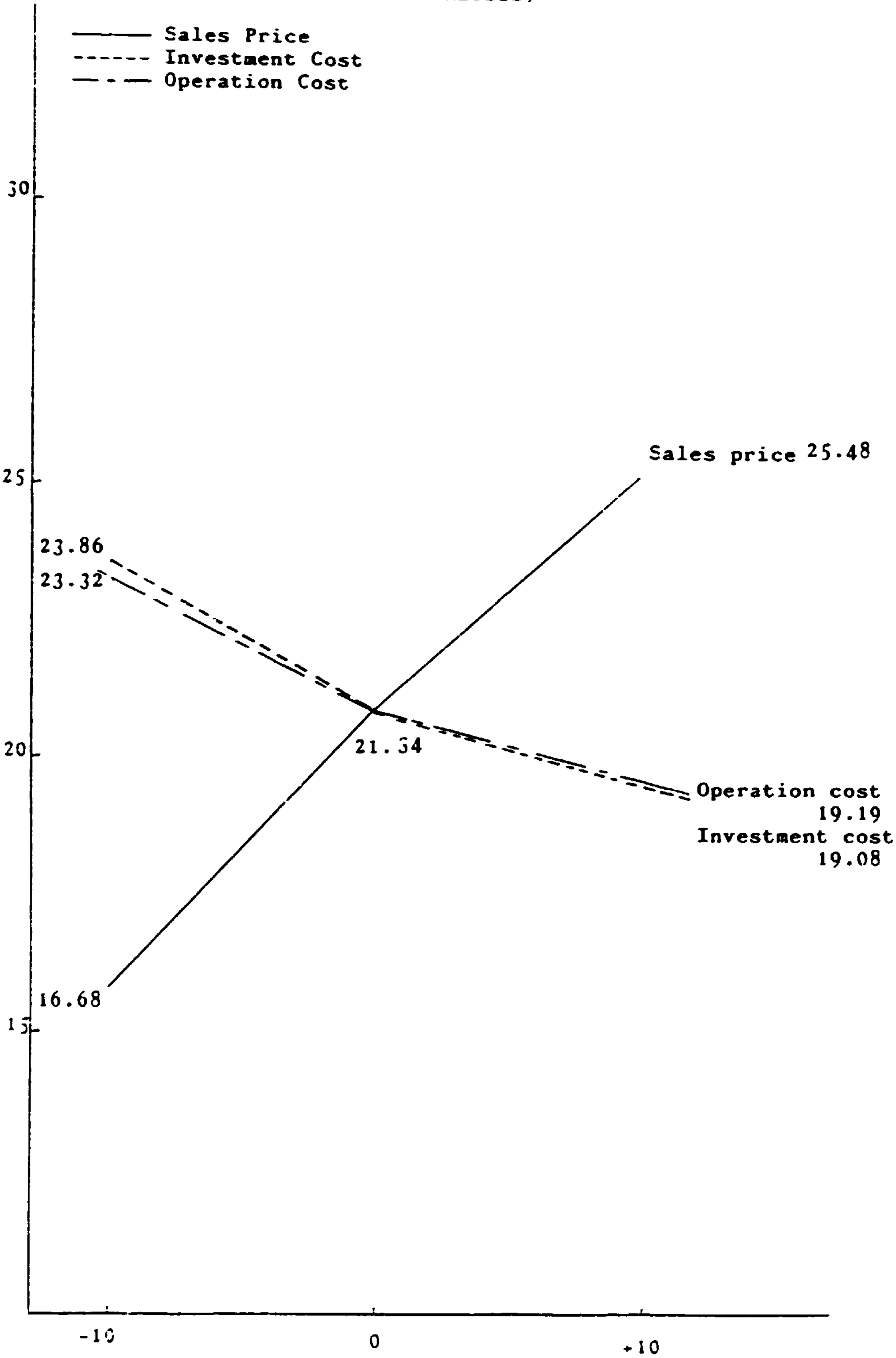

FIG. 10-2 IRROE AFTER TAX

(SENSITIVITY ANALYSIS)

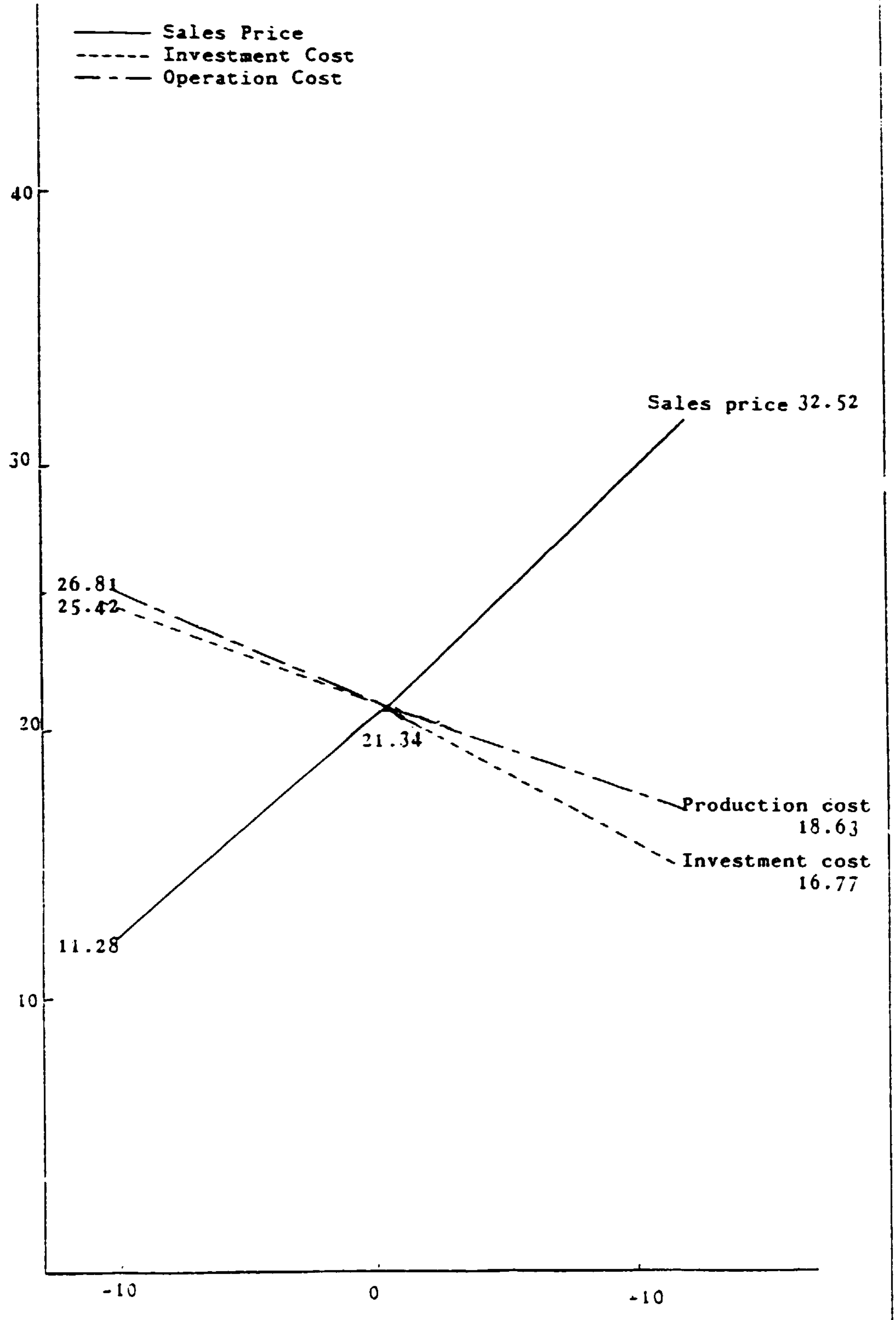

TABLE AN-1

ESTIMATED TOTAL ALUMINA CONSUMPTION

STEEL INDUSTRY

| | |
|---|---|
| A. National Steel Corp. 1/ | 3,516.50 |
| B. Mindanao Steel Corp. 2/ | 27.31 |
| C. Cathay Pacific 3/ | 285.00 |
| D. Other Steel Companies 4/ | 4,649.20 |
| TOTAL (MT) | 8,478.01 |

# TABLE AN-1a

## ANNUAL ALUMINA REFRACTORY REQUIREMENTS

## NSC, MSC, CATHAY STEEL AND OTHERS

| | SK Ratings | Annual Consumption (in MT) | Total |
|---|---|---|---|
| **A. Nat. Steel Corp.** | | | |
| 1. Alumina Bricks | | | |
| 1.1 Billets | | | |
| Ladle | 34 | 54.00 | 54.00 |
| | 38 | 1,848.00 | |
| | 39 | 623.00 | |
| | 40 | 452.00 | 2,923.00 |
| 1.2 Hot Mill | 28 | 2.00 | |
| | 33 | 31.00 | 33.00 |
| | 41 | 46.00 | 46.00 |
| Total | | | 3,056.00 |

2.0 Monolithics

| | | | |
|---|---|---|---|
| Ladle | 34 | 52.00 | 52.00 |
| | 38 | 45.00 | |
| | 40 | 42.00 | 87.00 |
| Tundish | 38 | 260.00 | 260.00 |

2.2 Hot Mills

| | | |
|---|---|---|
| Fire Mortar | 2.25 | |
| Castables | 3.00 | |
| Ramming Mix | 50.00 | |
| LD Fireclay | 1.00 | |
| SD Fireclay | 0.25 | |
| BRSMG | 5.00 | 61.50 |
| Total | | 460.50 |

NSC's Total Alumina
Refractories Consumption (in MT) 3,516.50

========

B. Mindanao Steel

1.0 Alumina Bricks

| | | | |
|---|---|---|---|
| 1.1 Furnace | 30 | 17.00 | |
| | 36 | 7.40 | 24.40 |

| | | | |
|---|---|---|---|
| 1.2 Boiler | 36 | 0.20 | |
| | 30 | 0.18 | 0.38 |
| Total | | | 24.78 |
| 2.0 Monolithics | | | |
| Mortar | 36 | 2.30 | |
| Castables | 36 | 0.23 | 2.53 |
| NSC's Total Alumina Refractories Corporation (in MT) | | | 27.31 |

C. Cathay Steel

| | | | |
|---|---|---|---|
| Hi-Alumina bricks | 38 | 285.00 | 285.00 |

D. Other Steel Companies

| Melters | Annual Rated Capacity (MT) | Ave. Unit Consumption of Alumina Refractories (MT) | Annual Consumption (MT) |
|---|---|---|---|
| 1. SKK Corporation | 72,000 | 0.0118 | 849.60 |
| 2. Armco-Marsteel Alloy Corporation | 60,000 | 0.0118 | 708.00 |
| 3. Milwaukee Industries | 60,000 | 0.0118 | 708.00 |
| 4. Metro Concast Corporation | 50,000 | 0.0118 | 590.00 |
| 5. Phil. Nails Wire Corporation | 50,000 | 0.0118 | 590.00 |
| 6. Apollo Steel Corporation | 45,000 | 0.0118 | 531.00 |
| 7. Armstrong | 30,000 | 0.0118 | 354.00 |
| 8. Osaka Steel | 10,800 | 0.0118 | 127.44 |
| 9. Master Steel | 9,000 | 0.0118 | 106.20 |
| 10. Union Steel | 7,200 | 0.0118 | 84.96 |
| Total | | | 4,649.20 |

Sample Data

| | SK Rating | MT | Rated Capacity | Ave. Unit Consumption |
|---|---|---|---|---|
| NSC | | 3,516.50 | 350,000 | 0.010 |
| Cathay | 38 | 285.00 | 24,000 | 0.012 |
| | | | | 0.011 |

TABLE AN-2

ESTIMATED ALUMINA REFRACTORY CONSUMPTION

OF REROLLERS

| BARS | Capacity | 0.0005 |
|---|---|---|
| 1. Alllied Metals | 14,400 | 7.20 |
| 2. Apollo Steel | 25,000 | 12.50 |
| 3. Best Industrial | 18,000 | 9.00 |
| 4. Capitol Steel | 26,000 | 13.00 |
| 5. Cathay Pacific | 20,000 | 10.00 |
| 6. Commercial Steel | 24,000 | 12.00 |
| 7. Continental Steel | 30,000 | 15.00 |
| 8. Falcon Metal | 1,200 | 0.60 |
| 9. Fidelity Steel | 11,000 | 5.50 |
| 10. Filipino Pipe | 20,000 | 10.00 |
| 11. Goldstone | 3,000 | 1.50 |
| 12. Island Metal | 14,400 | 7.20 |
| 13. Kingmaster | 30,000 | 15.00 |
| 14. Martian | 36,000 | 18.00 |
| 15. Merchant | 2,600 | 1.30 |
| 16. Metro Metal | 30,000 | 15.00 |
| 17. National Steel Corp. | 60,000 | 30.00 |
| 18. Osaka Steel | 22,500 | 11.25 |
| 19. Pag-asa Steel Works | 50,000 | 25.00 |
| 20. Prime Industrial | 4,800 | 2.40 |
| 21. Royale | 6,000 | 3.00 |

| | | |
|---|---|---|
| 22. South Pacific | 28,800 | 14.40 |
| 23. Union Industries | 18,000 | 9.00 |
| 24. Universal Steel Smelting | 18,000 | 9.00 |
| 25. Galaxie Steel | 2,400 | 1.20 |
| | 516,100 | 258.05 |

Wire Rods 0.0005

| | | |
|---|---|---|
| 1. Allied Metal | 14,400 | 7.20 |
| 2. Capitol Steel | 10,000 | 5.00 |
| 3. Filipino Pipe | 20,000 | 10.00 |
| 4. Island Metal | 21,600 | 10.80 |
| 5. Metro Concast | 90,000 | 45.00 |
| 6. Pag-asa Steel Works | 10,000 | 5.00 |
| 7. Cathay Pacific Steel | 84,000 | 42.00 |
| 8. Galaxie Steel Corp. | 21,600 | 10.80 |
| | 271,600 | 135.80 |

Shapes & Sections 0.0005

| | | |
|---|---|---|
| 1. R.C. Say | 2,000 | 1.00 |
| 2. Cathay Metal | 72,000 | 36.00 |
| 3. Filipino Pipe | 15,000 | 7.50 |
| 4. Lunar Steel | 36,000 | 18.00 |
| 5. Prime Steel | 19,200 | 9.60 |

| | | |
|---|---|---|
| 6. South Pacific | 7,200 | 3.60 |
| | 151,400 | 75.70 |
| Total | | 469.55 |

TABLE AN-3

Estimated Annual Average Unit Consumption

of Galvanized Iron Sheet Producers

| | | SK Rating | Quantity (in MT) | Prod'n Capacity | Ave. Unit Consumpt'n |
|---|---|---|---|---|---|
| St. Christopher Steel Corp. | Bricks | SK32-36 | 7.00 | | |
| | Castables | | 0.50 | | |
| | | | ---- | | |
| | | | 7.50 | 30,000 | 0.00025 |
| Jacinto Steel | Bricks | SK36 | 8.50 | | |
| | Castables | | 2.00 | | |
| | | | ---- | | |
| | | | 10.50 | 42,000 | 0.00025 |

| | |
|---|---|
| Total Production Capacity of Eleven Firms : | 438,000 |
| Average Unit Consumption | 0.00025 |
| Estimated Alumina Refractory Consumption of the Galvanized Iron Sheet Industry | 109.50 |
| | ====== |

TABLE AN-4

ANNUAL ALUMINA REFRACTORY REQUIREMENTS

CEMENT INDUSTRY

| Cement Plants | Production Capacity (MT Clinker) | Actual Annual Consumption (in MT) | Unit Consumption Kg/T Clinker |
|---|---|---|---|
| Mindanao | 135,936 | 57.50 | 0.423 |
| Fortune | 326,245 | 102.70 | 0.315 |
| Iligan | 420,824 | 121.00 | 0.288 |
| Floro | 453,119 | 130.00 | 0.287 |
| Northern | 679,678 | 161.00 | 0.237 |
| Apocemco | 200,755 | 60.94 | 0.304 |
| Bacnotan | 243,570 | 289.00 | 1.187 |
| Solid | 566,321 | 291.83 | 0.515 |
| FR | 543,742 | 314.00 | 0.577 |
| Rizal | 426,853 | 175.50 | 0.411 |
| Total | 3,997,043 | 1,703.47 | |
| Ave. Unit Consumption | | | 0.462 |

| Cement Plants | Production Capacity (MT Clinker) | Unit Consumption Kg/T Clinker | Estimated Consumption (in MT) |
|---|---|---|---|
| Continental | 283,199 | 0.462 | 130.84 |
| Hi-Cement | 432,229 | 0.462 | 199.69 |
| Pacific | 208,435 | 0.462 | 96.30 |
| Central | 256,012 | 0.462 | 118.28 |
| Davao Union | 480,882 | 0.462 | 222.17 |
| Republic | 386,111 | 0.462 | 178.38 |
| Titan Cement | 400,000 | 0.462 | 184.80 |
| Prime White Cement | 33,000 | 0.462 | 15.25 |
| Grand Cement | 672,000 | 0.462 | 310.46 |
| Total | 3,151,868 | | 1,456.17 |

TABLE AN-4a

ANNUAL ALUMINA REFRACTORY REQUIREMENTS

FOR SELECTED CEMENT PLANTS

| | | SK Ratings | Annual Consumption (in MT) | Total | Total Alumina Refractory |
|---|---|---|---|---|---|
| MPCC | Bricks | 34 | 6.00 | | |
| | | 36 | 20.00 | | |
| | | 39 | 24.00 | 50.00 | |
| | | | ----- | | |
| | Castable | | 7.50 | 7.50 | 57.50 |
| | | | | ---- | ===== |
| ICC | Bricks | 31-34 | 40.00 | | |
| | Hi-Alumina | 38 | 64.00 | 104.00 | |
| | | | ----- | | |
| | Castables | | 9.00 | | |
| | Mortars | | 8.00 | 17.00 | 121.00 |
| | | | ----- | ----- | ====== |

| | | | | | |
|---|---|---|---|---|---|
| Floro Cement | | | | | |
| | Bricks | 36 | 16.00 | | |
| | | 38 | 69.00 | 85.00 | |
| | | | ----- | | |
| | Castables | | 22.50 | | |
| | Mortars | | 22.50 | 45.00 | 130.00 |
| | | | ----- | ----- | ====== |
| FRCC | Bricks | 32 | 10.00 | | |
| | | 35 | 150.00 | | |
| | | 38 | 42.00 | 202.00 | |
| | | | ------ | | |
| | Castables | 1600 | 15.00 | | |
| | | 1600 | 3.00 | | |
| | | 1700 | 66.00 | | |
| | | 1600 | 28.00 | 112.00 | 314.00 |
| | | | ------ | ------ | ====== |
| Rizal | Bricks | 36 | 64.20 | | |
| | | 38 | 96.30 | 160.50 | |
| | | | ------ | | |
| | Castables | | 15.00 | 15.00 | 175.50 |
| | | | ------ | ------ | ====== |
| Solid | Bricks | 36 | 108.73 | | |
| | | 38 | 163.10 | 271.83 | |
| | | | ------ | | |

| | | | | | |
|---|---|---|---|---|---|
| | Castables | | 20.00 | 20.00 | 291.83 |
| | | | ------ | ------ | ====== |
| NCC | Bricks | Otto 42 | 20.00 | | |
| | | Otto 35 | 35.00 | | |
| | | 32 | 20.00 | | |
| | | 30 | 15.00 | | |
| | | 40 | 7.00 | | |
| | | 42 | 2.00 | | |
| | | 36 | 28.00 | | |
| | | 28 | 11.00 | 138.00 | |
| | | | ------ | | |
| | Castables | | 23.00 | 23.00 | 161.00 |
| | | | ------ | ------ | ====== |
| Fortune | | | | | |
| | Firebrick | 30 | 20.94 | | |
| | | 32 | 7.54 | | |
| | | 34 | 8.50 | 36.98 | |
| | | | ------ | | |
| | | 36 | 35.00 | 35.00 | |
| | | | ------ | | |
| | Bonding Mortar | | 8.49 | | |

| | | | | | |
|---|---|---|---|---|---|
| | Kaoram Castables | | 9.50 | | |
| | Gibram Castables | | 12.74 | 30.73 | 102.71 |
| | | | | | ====== |
| Apocemcor | | | | | |
| | | 34 | 28.64 | | |
| | | 35 | 24.80 | | |
| | | 38 | 7.50 | 60.94 | 60.94 |
| | | | ----- | ----- | ===== |
| Bacnotan | | | | | |
| | | 37 | 50.50 | | |
| | | 38 | 213.50 | 264.00 | |
| | | | ------ | | |
| | Castables | | 25.00 | 25.00 | 289.00 |
| | | | | ------ | ====== |
| Total | | | | | 1,703.48 MT |

TABLE AN-5

ANNUAL ALUMINA REFRACTORY REQUIREMENTS

FOR SELECTED GLASS PLANTS

| | | SK Ratings | Annual Consumption (in MT) | Total | Total Alumina Refractory |
|---|---|---|---|---|---|
| RGC | Fused Cast | 35 | 9.10 | | |
| | | 36 | 138.12 | | |
| | | 41 | 15.76 | 162.98 | |
| | | | ------ | | |
| | Fireclay | 32 | 264.94 | | |
| | | 34 | 111.40 | | |
| | | 35 | 32.02 | 408.36 | |
| | | | ------ | | |
| | Special Brick | 34 | 43.40 | | |
| | | 38 | 20.10 | | |
| | | 39 | 0.70 | 64.20 | |
| | | | ------ | | |
| | Hi-alumina | 38 | 0.14 | | |
| | | 39 | 1.40 | 1.54 | |
| | | | ------ | | |

| | | | | | |
|---|---|---|---|---|---|
| | Fireclay Mortar | | 1.00 | 1.00 | 638.08 |
| | | | | ---- | ====== |
| SMC | Firebrick | 31-34 | 500.00 | | |
| | Consumables | 38 | 60.00 | | |
| | Beta Alumina | 40 | 176.00 | 736.00 | 736.00 |
| | | | ------ | ------ | ====== |
| Union Glass | | | | | |
| | Firebricks | 34 | 12.60 | 12.60 | |
| | Cast | 35 | 34.78 | | |
| | | 35-37 | 47.88 | | |
| | | 38-42 | 33.86 | 116.52 | |
| | | | ------ | | |
| | Mortars | 32 | 27.22 | | |
| | | 34 | 9.07 | | |
| | | 35-37 | 5.04 | | |
| | Gunning Mix | 35-37 | 6.30 | | |
| | Mouldable | 38-42 | 0.63 | 48.26 | 177.38 |
| | | | ------ | | ====== |

Phil. Glass Bulb

| | | | | |
|---|---|---|---|---|
| Fireclay 130-1.3 | 32 | 0.57 | | |
| Fireclay 40 | 34 | 0.23 | | |
| Fireclay 40 6 | 34 | 0.67 | | |
| Fused Cast AZS | 35 | 0.56 | | |
| Fused Cast AZS | 36 | 1.06 | | |
| Sillimanite | 37 | 0.41 | | |
| Sillimanite 150-1. | 37 | 0.37 | 3.87 | |
| | | ---- | | |
| Sillimanite Mortar | 35-37 | 0.05 | | |
| Chamotte Mortar | 32-34 | 0.08 | | |
| Fireclay Mortar | | 0.02 | 0.15 | 4.02 |
| | | ---- | ---- | ==== |
| Total | | | | 1,555.48 |
| | | | | ======== |

## TABLE AN-5a

## ANNUAL ALUMINA REFRACTORY REQUIREMENTS

## OTHER GLASS COMPANIES

| | Annual Rated Capacity (MT) | Ave. Unit Consumption of Alumina Refractories (MT) | Estimated Annual Consumption (MT) |
|---|---|---|---|
| Union Industries | 44,550 | 0.002 | 89.10 |
| Pacific Enamel | 39,600 | 0.002 | 79.20 |
| Asia Brewery | 85,800 | 0.002 | 171.60 |
| Ruby Glass | 39,600 | 0.002 | 79.20 |
| Visayan Glass | 16,500 | 0.002 | 33.00 |
| | 226,050 | | 452.10 |

ESTIMATED ANNUAL UNIT CONSUMPTION

| | Alumina Consumption (in MT) | Rated Capacity | Ave. Unit Consumption |
|---|---|---|---|
| San Miguel Glass | 736.00 | 275,880 | 0.0027 |
| Union Glass | 177.38 | 66,000 | 0.0027 |

## TABLE AN-6

## ESTIMATED ANNUAL UNIT CONSUMPTION

## FOUNDRY INDUSTRY

| | Production Capacity (MT/YR) | Ave. Unit Consumption | Estimated Consumption |
|---|---|---|---|
| 1. Cast Iron | 94,000 | 0.009 | 846 |
| 2. Cast Steel | 85,000 | 0.010 | 850 |
| 3. Cast Bronze | 15,000 | 0.005 | 68 |
| 4. Cast Alumina | 40,600 | 0.005 | 203 |
| | 234,600 | | 1,967 MT |

## SAMPLE DATA

### Cast Iron

| Foundry | Pcs/Yr. | MT/Yr | Annual Capacity | Ave. Unit Consumption |
|---|---|---|---|---|
| Eastern | 2,233 | 7.8 | 720 | 0.011 |
| Kastiron | 200 | 7 | 400 | 0.018 |
| EEI | 300 | 11 | 7500 | 0.001 |
| | | | | ------ |
| | | | | 0.01 |

### Cast Steel

| Foundry | Pcs/Yr. | MT/Yr | Annual Capacity | Ave. Unit Consumption |
|---|---|---|---|---|
| AG&P | 15600 | 58.04 | 5750 | 0.010093 |
| | | | | ======== |

Cast Bronze

| Foundry | Pcs/Yr. | MT/Yr | Annual Capacity | Ave. Unit Consumption |
|---|---|---|---|---|
| Brinel | 200 | 0.68 | 150 | 0.004533 |
| | | | | ======== |

Cast Aluminum

| Foundry | Pcs/Yr. | MT/Yr | Annual Capacity | Ave. Unit Consumption |
|---|---|---|---|---|
| Phil. Alumina Wheels | 3,390 | 13 | | |
| | | 17 | | |
| | | -- | | |
| | | 30 | 3,390 | 0.008849 |
| New Far Eastern | 50 | 0.17 | 78 | 0.002179 |
| | | | | -------- |
| | | | | 0.005514 |
| | | | | ======== |

## TABLE AN-7

## ANNUAL ALUMINA REFRACTORY REQUIREMENTS

## FERRO ALLOY INDUSTRY

| | | SK Ratings | Annual Consumption (in MT) | Total | Total Alumina Refractory |
|---|---|---|---|---|---|
| MCCI | | | | | |
| | Bricks | SK 32 | 3.60 | | |
| | | SK 34 | 25.70 | | |
| | | SK 38 | 36.00 | | |
| | | SK 39 | 37.00 | 102.30 | |
| | Castables | | 10.00 | 10.00 | |
| | Mortars | | 18.00 | 18.00 | 130.30 |
| Ferrochem | | | | | |
| | Bricks | SK 32 | 27.00 | | |
| | | SK 34 | 21.10 | | |
| | | SK 36 | 22.80 | 70.90 | |

| | | | | |
|---|---|---|---|---|
| Mortar | | 55.00 | 55.00 | |
| Castables | | 20.00 | 20.00 | 145.90 |
| | | | ----- | ====== |

Inchrome
--------

| | | | | |
|---|---|---|---|---|
| Bricks | SK 32 | 3.83 | | |
| | SK 34 | 4.03 | | |
| | SK 36 | 7.40 | | |
| | SK 38 | 3.08 | 18.34 | |
| | | ---- | | |
| Mortars/Castables | | 5.00 | 5.00 | 23.34 |
| | | | ---- | ===== |

Ferrochrome
-----------

| | | | |
|---|---|---|---|
| Bricks | SK 32 | 64.00 | |
| | SK 34 | 64.00 | |
| | SK 35 | 92.00 | |
| | SK 37 | 92.00 | 312.00 |
| | | ----- | |

| | | | | |
|---|---|---|---|---|
| Castables | SK 32 - 34 | 17.90 | | |
| | SK 35 - 37 | 76.00 | | |
| | SK 38 - 42 | 15.60 | | |
| Mortar | | 33.00 | 142.50 | 454.50 |
| | | ----- | ------ | ====== |
| Metro Alloy * | | | | 241.53 |
| ----------- | | | | ====== |
| Total | | | | 995.57 |
| | | | | ====== |

* Metro Alloy's alumina refractory requirements is based on estimated unit consumption figure of 0.007 mt.

TABLE AN-8

ANNUAL ALUMINA REFRACTORY REQUIREMENTS

SUGAR INDUSTRY

| Factory | Normalk Daily Rated Capacity (MT) | Annual Rated Capacity (MT) | Annual Consumption (MT) |
|---|---|---|---|
| CASUCO | 4,000 | 960,000 | 19.20 |
| Hind | 500 | 120,000 | 2.40 |
| Paniqui | 1,200 | 288,000 | 5.76 |
| Tarlac | 7,000 | 1,680,000 | 33.60 |
| ARCAM | 5,000 | 1,200,000 | 24.00 |
| PASUDECO | 6,500 | 1,560,000 | 31.20 |
| Canlubang | 6,100 | 1,464,000 | 29.28 |
| Don Pedro | 7,000 | 1,680,000 | 33.60 |
| Batangas | 4,000 | 960,000 | 19.20 |
| BISUDECO | 4,000 | 960,000 | 19.20 |
| | | | |
| Pilar | 3,500 | 840,000 | 16.80 |
| Asturias | 1,250 | 300,000 | 6.00 |
| Passi | 5,000 | 1,200,000 | 24.00 |
| | | | |
| Azucar | 3,700 | 888,000 | 17.76 |
| First Farmers | 4,500 | 1,080,000 | 21.60 |
| Hawaiian Phils. | 6,200 | 1,488,000 | 29.76 |
| AIDSISA | 4,000 | 960,000 | 19.20 |

| | | | |
|---|---|---|---|
| VICMICO | 10,000 | 2,400,000 | 48.00 |
| Lopez | 7,500 | 1,800,000 | 36.00 |
| Sagay | 3,000 | 720,000 | 14.40 |
| Darao | 1,500 | 360,000 | 7.20 |
| San Carlos | 5,600 | 1,344,000 | 26.88 |
| Ma-ao | 5,280 | 1,267,200 | 25.34 |
| La Carlota | 10,000 | 2,400,000 | 48.00 |
| BISCOM | 10,000 | 2,400,000 | 48.00 |
| SONEDCO | 4,000 | 960,000 | 19.20 |
| Dacongcogon | 1,800 | 432,000 | 8.64 |
| URSUMCO | 4,000 | 960,000 | 19.20 |
| Bais | 8,000 | 1,920,000 | 38.40 |
| Tolong | 3,000 | 720,000 | 14.40 |
| | | | |
| Bogo-Medelin | 2,500 | 600,000 | 12.00 |
| Durano | 2,000 | 480,000 | 9.60 |
| HIDECO | 5,000 | 1,200,000 | 24.00 |
| Democ-Rosario | 2,500 | 600,000 | 12.00 |
| | | | |
| BUSCO | 6,000 | 1,440,000 | 28.80 |
| SASUCECO | 4,000 | 960,000 | 19.20 |
| Total | | 40,591,200 | 811.82 |

## ESTIMATED

## ANNUAL AVERAGE UNIT CONSUMPTION

| | SK Rating | Pcs. | MT | Annual Rated Capacity (MT) | Ave. Unit Consumption |
|---|---|---|---|---|---|
| ARCAM & Co. | 35 | 10,000 | 35 | 1,200,000 | 0.000029 |
| Hawaiian-Phils. Co. | 34 | 5,000 | 17 | 1,488,000 | 0.000011 |
| PASUDECO | 34 | 6,000 | 20 | 1,560,000 | 0.000013 |
| | | | 72 | | 0.000018 |

TABLE AN-9

ANNUAL ALUMINA REFRACTORY REQUIREMENTS
WOOD PROCESSING INDUSTRY

1. VENEER PLANTS

| Plant | Daily Rated Capacity (M3) | Annual Rated Capacity (M3) | Annual Estimated Consumption (0.0005) |
|---|---|---|---|
| Pamplona Redwood & Veneer Co. | 38 | 8,550 | 4.446 |
| Curuan Timber Corp. | 58 | 13,050 | 6.786 |
| Mahogany Products, Inc. | 48 | 10,800 | 5.616 |
| Lianga Bay Logging Co., Inc. | 47 | 10,575 | 5.499 |
| Maguindanao Timber Products, Inc. | 114 | 25,650 | 13.338 |
| Paper Industries Corp. of the Phil. | 47 | 10,575 | 5.499 |
| Maranao Timer Products, Inc. | 72 | 16,200 | 8.424 |
| Greenbelt Wood Products, Inc. | 28 | 6,300 | 3.276 |
| | 452 | 101,700 | 52.884 |

2. PLYWOOD

| Plant | Daily Rated Capacity (M3) | Annual Rated Capacity (M3) | Annual Estimated Consumption (0.0005) |
|---|---|---|---|
| REGION 2 | | | |
| Taggat Industries, Inc. | 151 | 33,975 | 17.667 |
| Tropical Phil. Wood Inc. | 226 | 50,850 | 26.442 |
| Acme Veneer & Plywood Co. Inc. | 74 | 16,650 | 8.658 |
| Timer Exports Co., Inc. | 38 | 8,550 | 4.446 |
| | 489 | 110,025 | 57.213 |
| REGION 4 | | | |
| Gen. Plywood & Veneel | 104 | 23,400 | 12.168 |
| Int'l. Hardwood & Veneer Co. of the Philippines | 136 | 30,600 | 15.912 |
| Sta. Ana Hardwood Corp. | 75 | 16,875 | 8.775 |
| Republic Wood Commodities Mfg. Corp. | 68 | 15,300 | 7.956 |
| Phil. Plywood Corp. | 57 | 12,825 | 6.669 |
| | 440 | 99,000 | 51.48 |
| REGION 9 | | | |
| Sirawai Plywood & Lumber Co. | 94 | 21,150 | 10.998 |

- Continued to next page -

| | | | |
|---|---|---|---|
| First Plywood Corp. | 85 | 19,125 | 9.945 |
| Sta. Clara Lumber Co. | 151 | 33,975 | 17.667 |
| Zamboanga Wood Products, Inc. | 94 | 21,150 | 10.998 |
| | 424 | 95,400 | 49.608 |
| REGION 10 | | | |
| Industrial Timber Corp. | 189 | 42,525 | 22.113 |
| Nasipit Lumber Co., Inc. | 120 | 27,000 | 14.04 |
| Sta. Ines Melale Forest Products, Corp | 453 | 101,925 | 53.001 |
| R.C. Aquino Timber & Plywood | 57 | 12,825 | 6.669 |
| J.C. Aquino & Plywood | 170 | 38,250 | 19.890 |
| Standard Plywood Corp. | 113 | 25,425 | 13.221 |
| Talakag Timber, Inc. | 113 | 25,425 | 13.221 |
| Far East Timberland & Plywood Corp. | 113 | 25,425 | 13.221 |
| Vicmar Devt. Corp. | 71 | 15,975 | 8.307 |
| Butuan Logs, Inc. | 38 | 8,550 | 4.446 |
| Union Plywood | 94 | 21,150 | 10.998 |
| | 1,531 | 344,475 | 179.127 |
| REGION 11 | | | |
| Aguinaldo Devt. Corp. | 160 | 36,000 | 18.720 |
| C. Alcantara & Sons, Inc. | 379 | 85,275 | 44.343 |
| Davao Plywood Co., Inc. | 189 | 42,525 | 22.113 |
| Earsun Co., Ltd. | 176 | 39,600 | 20.592 |
| Sta. Clara Housing Industries, Inc. | 151 | 33,975 | 17.667 |

| | | | |
|---|---|---|---|
| Aras-Asan Timber Co., Inc. | 94 | 21,150 | 10.998 |
| Srigao Devt. Corp. | 226 | 50,850 | 26.442 |
| PICOP I | 170 | 38,250 | 19.89 |
| PICOP II | 305 | 68,625 | 35.685 |
| North Camarines Lumber Co., Inc. | 155 | 34,875 | 18.135 |
| | 2,005 | 451,125 | 234.585 |
| REGION 12 | | | |
| Findlay Millar Timber Co., Inc. | 151 | 33,975 | 17.667 |
| Ever Sun Devt. Ltd. | 651 | 146,475 | 76.167 |
| Sta. Clara Lumber Co. | 151 | 33,975 | 17.667 |
| M & S Co., Inc. | 45 | 10,125 | 5.265 |
| | 998 | 224,550 | 116.766 |
| | 5,887 | 1,324,575 | 688.78 |
| Total (Veneer & Plywood) | 6,339 | 1,426,275 | 741.663 |

ESTIMATED ANNUAL AVERAGE UNIT CONSUMPTION

| | SK Rating | Pcs. | MT | Rated Capacity | Ave. Unit Consumption |
|---|---|---|---|---|---|
| Vicmar Devt. Corp. | SK 36 | 2,000 | 7 | 15,975 | 0.00044 |
| Zamboanga Wood Products | SK 38 | 3,000 | 12 | 21,150 | 0.00057 |

| | | | | | |
|---|---|---|---|---|---|
| Davao Plywood | SK 32/36 | 6,200 | 23 | 42,525 | 0.00054 |
| | | | 42 | | 0.00052 |

## TABLE AN-10

## ANNUAL ALUMINA REFRACTORY REQUIREMENTS

## LIME INDUSTRY

| | SK Rating | Annual Consumption (in MT) | Total |
|---|---|---|---|
| **Guanzon Lime** | | | |
| Hi-Alumina | SK 36 | 276.48 | |
| Mortar | | 4.00 | 280.48 |
| | | | ====== |
| **Atlas Consolidated** | | | |
| Firebricks | SK 32 - 34 | 104.90 | |
| Hi-Alumina | SK 35 - 37 | 26.70 | |
| Mortar | | 10.80 | |
| Castables | | 3.83 | 146.23 |
| | | | ====== |
| Total | | | 426.71 |
| | | | ====== |

TABLE AN-11

ANNUAL ALUMINA REFRACTORY REQUIREMENT

COCONUT OIL MILLS

REGIONAL AREA

| Metro Manila Area: | Installed Capacity (MTY) | Estimated Annual Consuaption |
|---|---|---|
| 1. Metroplex Commodities, Inc. | 120,000 | 8.40 |
| 2. International Oil Factory | 90,000 | 1.24 |
| 3. Proctor & Gamble | 90,000 | 6.30 |
| 4. Phil. Refining Company | 82,500 | 5.78 |
| 5. Central Vegetable Company | 67,500 | 0.11 |
| 6. Tantuco Industrial | 60,000 | 4.20 |
| 7. Tantuco Enterprise | 52,500 | 3.68 |
| 8. Liberty Oil Factory | 30,000 | 6.10 |
| 9. Prime Copra | 30,000 | 2.10 |
| 10. Royal Industrial | 22,500 | 1.58 |
| 11. Yu Yek Manufacturing | 22,500 | 1.58 |
| 12. Crystal Oil Manufacturing | 15,000 | 1.05 |
| 13. King Oil Mill | 15,000 | 1.05 |
| 14. R & A Coconut Products | 15,000 | 1.05 |
| 15. Po Man Hing | 15,000 | 1.05 |
| 16. Sta. Ane Mfg. & Dev. Inc. | 15,000 | 1.05 |
| 17. Angmaya Coco Resources | 15,000 | 1.05 |

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| | | | |
|---|---|---|---|
| 18. | RFM Corp. | 15,000 | 1.05 |
| 19. | APD Agri-Produce | 7,500 | 0.52 |
| 20. | People's Ind'l & Com'l Corp. | 7,500 | 0.52 |
| | Sub Total | 787,500 | 49.46 |

Laguna/Quezon Area:

| | | | |
|---|---|---|---|
| 1. | San Pablo Mfg. Corp. | 150,000 | 10.50 |
| 2. | SMC-Lucena Oil Factory | 120,000 | 8.40 |
| 3. | Tantuco Enterprises | 90,000 | 6.30 |
| 4. | Southern Luzon Coconut Oil Mill | 75,000 | 5.25 |
| 5. | Licup Oil Mill | 75,000 | 5.25 |
| 6. | Royal Oil Products Inc. | 60,000 | 4.20 |
| 7. | Coco-Chemical Phiis., Inc. | 60,000 | 4.20 |
| 8. | Unideco Consolidated Mfg. | 60,000 | 4.20 |
| 9. | PCY Oil Mfg. Corp. | 60,000 | 4.20 |
| 10. | Dilson Enterprises | 60,000 | 4.20 |
| 11. | Feed Tech | 45,000 | 3.15 |
| 12. | J n J Industries | 45,000 | 3.15 |
| 13. | New Lucena Oil Products | 45,000 | 3.15 |
| 14. | A. Coco Inc. | 30,000 | 2.10 |
| 15. | Norldwide Oil Mill | 30,000 | 2.10 |
| 16. | La Suerte Oil Mill | 30,000 | 2.10 |
| 17. | Mina Mill | 30,000 | 2.10 |
| 18. | TDP Oil Mill | 15,000 | 1.05 |
| 19. | PCB Oil Mill | 15,000 | 1.05 |
| 20. | New Sunripe Coco Products | 15,000 | 1.05 |

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| | | | |
|---|---|---|---|
| 21. | Laguna Insular Comm'l | 15,000 | 1.05 |
| 22. | Peter Paul Phil. Corp. | 12,000 | 0.84 |
| 23. | Arcoco Oil Mill Inc. | 9,000 | 0.63 |
| 24. | Franklin Daker Co. of the Phil. | 8,100 | 0.57 |
| 25. | Blue Bar Coconut Phil | 8,100 | 0.57 |
| 26. | Apo Oilmill | 7,500 | 0.52 |
| 27. | Quezon Champion | 7,500 | 0.52 |
| 28. | Luz Enterprises (Vitarich) | 7,500 | 0.52 |
| 29. | Metro Agro | 3,000 | 0.21 |
| 30. | Fortune Coco | 3,000 | 0.21 |
| 31. | Southern Tagalog Oil Mill | 3,000 | 0.21 |
| 32. | Bagong Silang | 3,000 | 0.21 |
| 33. | El Dorado | 2,400 | 0.17 |
| 34. | Remigio Castillo | 750 | 0.05 |
| 35. | Aga Enterprises | 300 | 0.02 |
| | Sub Total | 1,200,150 | 84.00 |

Bicol Area:

| | | | |
|---|---|---|---|
| 1. | Bicol Oil Mill & Refinery | 142,500 | 9.98 |
| 2. | SMC-Legaspi Oil Co., Inc. | 135,000 | 9.45 |
| 3. | Coco Complex | 75,000 | 5.25 |
| 4. | Sorsogon Oil Mill | 15,000 | 1.05 |
| 5. | Haga Sunbean Corp. | 3,000 | 0.21 |
| | Sub Total | 370,500 | 25.94 |

Visayas Area:

| | | |
|---|---|---|
| 1. Lu Do & Lu Ya Corp. | 180,000 | 12.60 |
| 2. DOLOIL, Inc. | 120,000 | 8.40 |
| 3. Ricor Oil Mill & Refinery Corp. | 45,000 | 3.15 |
| 4. Siain Enterprises | 30,000 | 2.10 |
| 5. Visayan Manufacturing | 15,000 | 1.05 |
| 6. Unex Industries Inc. | 15,000 | 1.05 |
| 7. R & A Cocount Products | 6,000 | 0.42 |
| 8. Go Pao Oil Mill | 6,000 | 0.42 |
| 9. CWF Mfg. Corp. | 2,400 | 0.17 |
| 10. Golden Star Milling Co., Inc. | 1,500 | 0.11 |
| Sub Total | 420,900 | 29.47 |

Mindanao Area:

| | | |
|---|---|---|
| 1. Granexport Mfg. Corp. | 300,000 | 21.00 |
| 2. Legaspi Oil Company | 240,000 | 16.80 |
| 3. Interco Mfg. Corp. | 180,000 | 12.60 |
| 4. SMC-Iligan Oil Mill | 180,000 | 12.60 |
| 5. Southern Island Oil Mill | 180,000 | 12.60 |
| 6. Indo-Phil Oil Mill | 126,900 | 8.88 |
| 7. Cagayan de Oro Oil Company | 120,000 | 8.40 |
| 8. Phil. Int'l Devt. Corp. | 90,000 | 6.30 |
| 9. Davao Gulf Oil Company, Inc. | 90,000 | 6.30 |
| 10. Phil-Agro | 84,000 | 5.88 |
| 11. Pacific Oil Products | 75,000 | 5.25 |

- Continued to next page -

| | | | |
|---|---|---|---|
| 12. | Lim Ket Kai Sons Milling | 60,000 | 4.20 |
| 13. | SKT Oil Mill | 45,000 | 3.15 |
| 14. | Consolidated Coco | 37,500 | 2.63 |
| 15. | Interco Mfg. Corp. | 37,500 | 2.63 |
| 16. | R & A Coconut Products | 30,000 | 2.10 |
| 17. | Cotabato Agri-Products Corp. | 7,500 | 0.52 |
| 18. | East Orient Oil Co., Inc. | 3,000 | 0.21 |
| | Sub Total | 1,886,400 | 132.05 |
| | Total | 4,665,450 | 320.92 |

## ESTIMATED

## ANNUAL AVERAGE UNIT CONSUMPTION

| | SK Rating | Q'ty | Metric tonnes | Annual Rated Capacity | Average Unit Consumption |
|---|---|---|---|---|---|
| Liberty Oil Factory | | | | | |
| | SK 32 | 400pcs | 1.30 | | |
| | Castables | 1,000kg/2.5mos. | 4.80 | | |
| | | | ---- | | |
| | | | 6.10 | 30,000 | 0.000203 |
| Int'l Oil Factory | | | | | |
| | SK 34 | 100pcs | 0.43 | | |
| | Castables | 900kgs | 0.90 | | |
| | | | ---- | | |
| | | | 1.33 | 90,000 | 0.000015 |
| Central Veg. Oil Co | | | | | |
| | SK 34 | 110kgs/Yr | 0.11 | 67,500 | 0.000002 |
| | | | | | 0.000077 |
| | | | | | ======== |

TABLE AN-12

ANNUAL ALUMINA REFRACTORY REQUIREMENTS

CERAMIC INDUSTRY

| | SK Rating | Consumption (in MT) | | Total Alumina Refractories |
|---|---|---|---|---|
| A. CERAMIC TILES | | | | |
| 1. Fil Hispano | | | | |
| Bricks | 32 - 34 | 2.00 | 2.00 | |
| Castables | 1350 | 4.00 | | |
| | 35 | 11.00 | 15.00 | 17.00 |
| | | ----- | ----- | ===== |
| 2. Mariwasa | | | | |
| Bricks | 36 | 15.00 | 15.00 | |
| Castables | | 9.00 | | |
| Mortar | | 0.60 | 9.60 | 24.60 |
| | | ----- | ----- | ===== |

3. Porcelana Mariwasa Noritake

| | | | |
|---|---|---|---|
| Bricks | 34 | 31.00 | 31.00 |
| | | ----- | ===== |

4. Pioneer Ceramics, Inc.

| | | | |
|---|---|---|---|
| Bricks | 32 | 5.58 | 5.58 |
| | | ---- | ==== |

5. Goldvest Ceramics

| | | | |
|---|---|---|---|
| Bricks | 32 | 2.00 | 2.00 |
| | | ---- | ==== |

6. Pacific Ceramics

| | | | |
|---|---|---|---|
| Bricks | 32 | 2.42 | 2.42 |
| | | ---- | ==== |

B. Vitreous China Sanitary Wares

1. Saniwares

| | | | |
|---|---|---|---|
| Bricks | 35 | 25.00 | 25.00 |
| | | ----- | ===== |
| Total | | | 107.60 |
| | | | ====== |

## TABLE AN-13

## ANNUAL ALUMINA REFRACTORY REQUIREMENTS

## PETROLEUM INDUSTRY

| | SK Rating | Annual Consumption (in MT) | Total Alumina Refractories |
|---|---|---|---|
| **Philipinas** | | | |
| Bricks | 34 | 4.07 | |
| Castables | | 15.00 | 19.07 |
| | | | ===== |
| **Caltex** | | | |
| Bricks | 34 | 5.00 | |
| Castables | | 18.00 | 23.00 |
| | | | ===== |

Bataan Refinery Corp.

| | | |
|---|---|---|
| Castables | 29.00 | 29.00 |
| | | ===== |
| Total | | 71.07 |
| | | ===== |

Annex. 2

# DOMESTIC REFRACTORY RAW MATERIALS IN THE PHILIPPINES

## 1. General

There are many of unexploited resources in the Philippines, though to be capable of supplying ceramic raw materials, but there is not sufficient data to make judgement of their value for producing refractories.

Among the raw materials for refractories available in the Philippines, there is chrome ore which is famous throughout the world, and which is exported to Japan and other countries. This raw material is used for basic refractories but not for alumina refractories.

In the survey, the consultantngathered information on raw materials of possible use for an alumina refractories project, and collected some raw material samples for tests in Japan. An outline of domestic raw materials for refractories in the Philippines is given below on the basis of the test result.

## 2. Deposit of Various clay materials

### 1) TALAKAG CLAY

Location : Duminorog & Tikilaan, Talakag, Bukidnon
Reserve : 1.5 million MT
Supplier : Firestone Ceramics
Status of
Operation : Small-scale mining

2) GINGOOG WHITE CLAY

Location : Mat-i, Claveria, & Ginoog, Misamis Oriental
Reserve : 2.5 million MT as estimated by MGB
Supplier : Mr. Tony Parba
Status of
Operation : No operation, property is still prospect

3) TAGURANAO WHITE CLAY

Location : Mt. Talomo, Taguranao, Davao City
Reserve : No data yet but estimated at 100,000MT, possible
Supplier : Proculu Fuentes III, Davao City
Status of
Operation : No operation, still a prospect

4) MALITBOG WHITE CLAY

Location : Malitbog, Bukidnon
Reserve : No data yet but reported to be as extensive as Talakag WC
Supplier : Mr. Gador, Cagayan de Oro City
Status of
Operation : No operation, still a prospect

5) MANITO WHITE CLAY

Location : Sitio San Jose, Barrio Magotgot, Manito, Albay
Reserve : No data
Supplier : Saniwares, Inc.

6) MARAWI BALL CLAY

Location : Barrio Bangon, Ramain & Marawi City, Lanao del Sur, in a wide plane (flood plain) of Lake Lanao
Reserve : Possibly 1 million MT (estimate by MSRI)
Supplier : Atty, Abdullah D. Mama-o, Marawi City
Status of Operation : No operation, property is still a prospect

7) STA. ELENA WHITE CLAY

Location : Sta. Elena, Camarines Norte, beside the Bulala Flint Clay property of Firestone Ceramics
Reserve : No exploration data yet; reconnaissance survey indicate high potential
Supplier : Mr. Ramon S. Reyes, Lucena City
Status of Operation : No operation, property is still a prospect

8) KIBENTON WHITE CLAY

Location : Kibenton, Bukidnon
Reserve : No data yet but properties reported to be similar to Talakag
Supplier : Felicito Radaza
Status of Operation : No operation, property is still a prospect

9) DIPOLOG WHITE CLAY

Location : Sitio Lalab, Sibutad, Zamboanga del Norte
Reserve : Possible reserve estimated at 100,000 MT; similar occurrences in neighboring towns also discovered
Supplier : Edger Cabrera, IRA Mining, Iligan City
Status of Operation : Now operating, unsystematic small-scale mining

10) NORTH GIGANTES WHITE CLAY

Location : North Gigantes Island, Carles, Iloilo
Reserve : Possible reserve estimated at 200,000 MT
Supplier : Venancio Cudilla
Status of Operation : Stopped operation

11) SAN DIONISIO BALL CLAY

11) <u>SAN DIONISIO BALL CLAY</u>

Location : Barrio Capinang, San Dionisio, Iloilo
Reserve : 2 million MT possible reserve
Supplier : Venancio Cudilla 102 Gen Luna St., Iloilo City

12) <u>LEMERY BALL CLAY</u>

Location : Barrios Gerongan & Buenavista, Lemery, Iloilo City
Reserve : No data but estimated at 1,000 MT possible
Supplier : Emilio Evangelista, 28 San Jose, Iloilo City

13) <u>SINUKNIPAN BALL CLAY</u>

Location : Siniknipan & Del Gallego, Camarines Sur
Reserve : Possible reserve, 1.2 million MT
Supplier : Mr. Romeo Mercado, c/o Tony Alvarez, Paco Station, PNR

14) <u>MAGPET WHITE CLAY</u>

Location : Barrio Inac & Doles, Magpet, North Cotabato
Reserve : 525,000 MT possible reserve
Supplier : Mr. Desiderio Go ; Virgo Camtrade, Devao City
Status of Operation : Stopped operation

15) <u>INFANTA WHITE CLAY</u>

| | | |
|---|---|---|
| Location | : | Infanta, Pangasinan |
| Reserve | : | No estimate by Bureau of Mines, must be large as this is one of the main sources of clay for Luzon ceramic plants |
| Supplier | : | K&G Mining Corporation, Quezon City |
| Status of Operation | : | Small-scale |

3. Result of Chemical Analysis

Chemical Composition of Clay Materials in the Philippines

| Sample Name | SiO2 | Al2O3 | Fe2O3 | TiO2 | CaO | MgO | Na2O | K2O | Total | L.O.I |
|---|---|---|---|---|---|---|---|---|---|---|
| Talakag WC(R) | 50.6 | 45.1 | 0.62 | 2.79 | 0.20 | 0.38 | 0.43 | 0.17 | 100.29 | 21.7 |
| Talakag WC(B) | 52.1 | 43.3 | 0.63 | 2.41 | 0.26 | 0.41 | 0.40 | 0.23 | 99.74 | 20.6 |
| Gingoog WC | 49.6 | 45.9 | 0.82 | 1.96 | 0.19 | 0.33 | 0.44 | 0.15 | 99.39 | 19.6 |
| Tagranao WC | 51.0 | 45.0 | 1.28 | 1.70 | 0.10 | 0.30 | 0.30 | 0.14 | 99.82 | 18.0 |
| Maritbog WC | 48.7 | 44.8 | 1.25 | 2.02 | 0.16 | 0.28 | 0.33 | 0.13 | 97.67 | 19.8 |
| Marawi BC | 49.7 | 42.9 | 2.96 | 2.34 | 0.46 | 0.63 | 0.43 | 0.18 | 99.60 | 18.3 |
| Sta. Elena WC | 53.3 | 33.9 | 0.45 | 0.09 | 4.08 | 0.71 | 3.78 | 2.77 | 99.08 | 7.4 |
| Dipolog WC | 69.6 | 27.6 | 0.22 | 0.78 | 0.22 | 0.33 | 0.01 | 0.47 | 99.83 | 12.2 |
| North Gigantes WC | 71.6 | 24.5 | 0.33 | 0.60 | 0.20 | 0.68 | 0.62 | 1.59 | 100.02 | 7.1 |
| San Dionisio BC | 62.0 | 32.3 | 2.15 | 0.86 | 0.74 | 0.76 | 0.37 | 0.39 | 99.56 | 17.7 |
| Lemery BC | 64.1 | 30.4 | 2.98 | 0.95 | 0.24 | 0.74 | 0.47 | 0.37 | 100.25 | 14.2 |
| Shinukunipan BC | 56.4 | 35.9 | 3.92 | 1.16 | 0.41 | 0.60 | 0.51 | 0.20 | 98.09 | 16.3 |
| Hagpel WC | 56.9 | 39.3 | 1.27 | 1.37 | 0.20 | 0.30 | 0.41 | 0.21 | 99.96 | 13.6 |
| Infanta WC | 49.8 | 36.4 | 0.18 | 0.52 | 9.50 | 1.25 | 1.01 | 0.26 | 98.92 | 12.2 |

Remarks;
R: To mean Raw Clay
B: To mean Beneficiated Clay

## 4. Result of X-Ray Analysis

Constituent Minerals of Clay Materials in the Philippines

| Name | Color | Main Components | Minor Components |
|---|---|---|---|
| TALAKAG WHITE CLAY(R) | BW | HA-10A | CR,HA-7A(m),MUS(?) IL(?) |
| TLAKAG WHITE CLAY(B) | BW | HA-10A | HA-7A(m),CR,MUS(?) IL(?) |
| GINGOOG WHITE CLAY | LBWW | HA-7A(m) | KA-1MD(?) |
| TAGRANAO WHITE CLAY | LBWW | HA-10A | HA-7A(m),MUS(?) |
| MARITBOG WHITE CLAY | LBWW | HA-10A | IL(?),MUS(?) |
| MARAWI BALL CLAY | LBW | HA-10A | HA-7A(m) |
| STA.ELENA WHITE CLAY | LGW | AL,HA-10A,HA-7A(m) | MUS,IL,CR(?),AN(?) |
| DIPLOLOG WHITE CLAY | LG | KA-1T,Q | IL,MUS |
| NORTH GIGANTES WHITE CLAY | PW | KA-1MD,Q | MUS,IL |
| SANDIONISIO BALL CLAY | B | HA-7A(m),Q | IL(?) |
| LEMERY BALL CLAY | DBW | KA-1MD,HA-7A(m),Q | IL(?) |
| SINUKUNIPAN BALL CLAY | G | KA-1T,Q | IL |

| | | | |
|---|---|---|---|
| MAGPET WHITE CLAY | PW | KA-1T,CR | MUS(?) |
| INFANTA WHITE CLAY | W | LAU,KA-1T,Q | HA-7A(m),MUS(?) IL(?) |

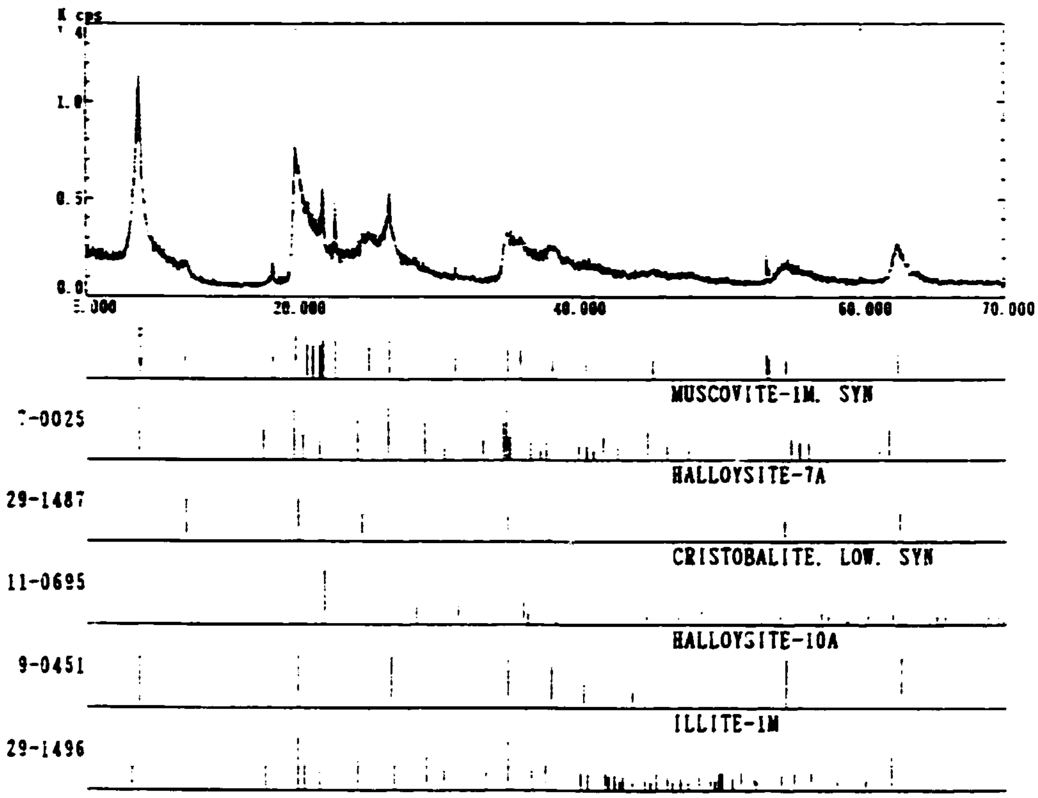
REMARKS; Color B:Black,DBW:Dark Brown,BW:Brown,LBW:Light Brown,LBWW:Light Brownish White,G:Gray LG:Light Gray,LGW:Light Grayish White PW:Pinkish White,W:White

| | | |
|---|---|---|
| Mineral Name | HA-10A:Halloysite | HA-7A(m):Metahalloysite |
| | KA-1T:Kaolinite 1T | KA-MD:Kaolinite 1MD |
| | Q:Quartz | CR:Cristobalite |
| | AL:Albite | MUS:Muscobite |
| | IL:Illite | AL:Albite |
| | LAU:Laumontite | |

# X-RAY ANALYSIS

TALAKAG CLAY (R)

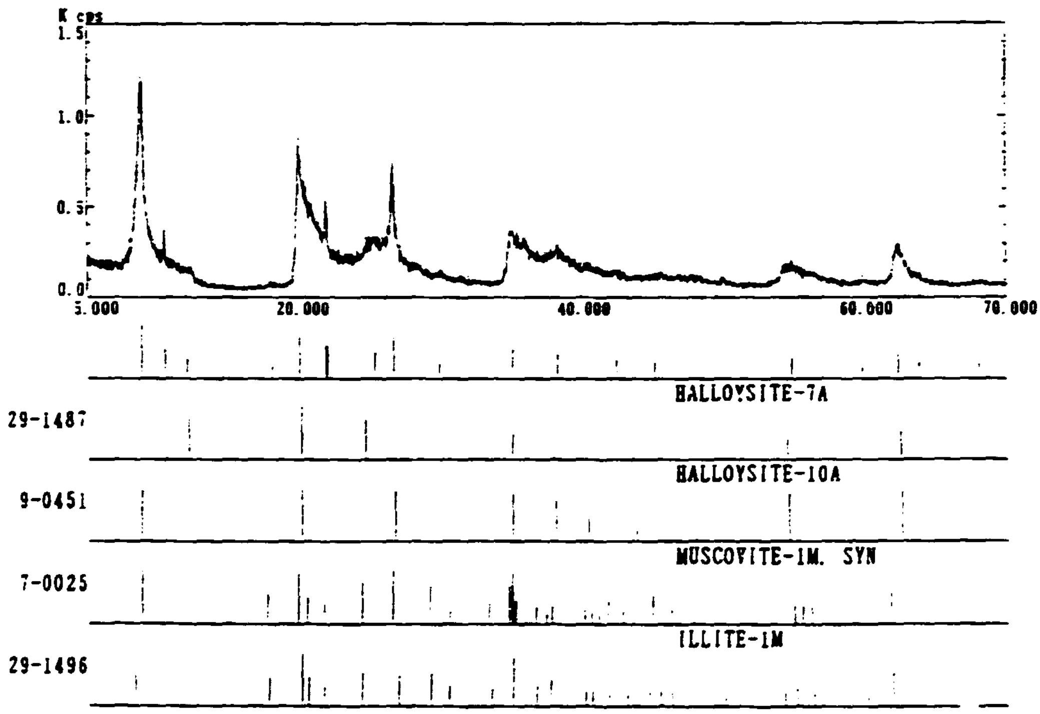
Location : Duminorog & Tikilaan, Talakag, Bukidnon
Reserve : 1.5 million MT
Supplier : Firestone Ceramics
Status of
Operation : Small-scale mining



# X-RAY ANALYSIS

TALAKAG CLAY (B)

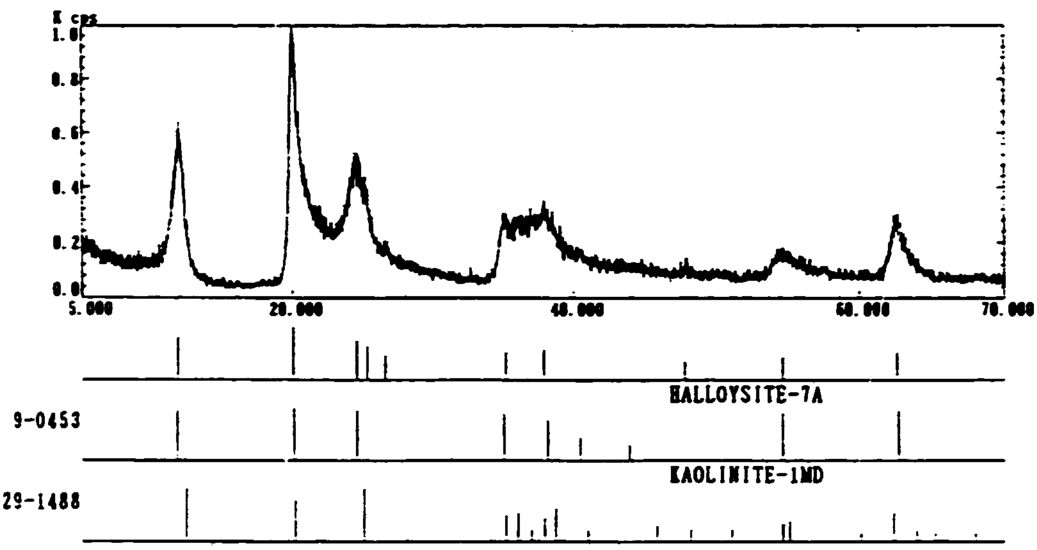
Location : Duminorog & Tikilaan, Talakag, Bukidnon
Reserve : 1.5 million MT
Supplier : Firestone Ceramics
Status of
Operation : Small-scale mining



# X-RAY ANALYSIS

GINGOOG WHITE CLAY

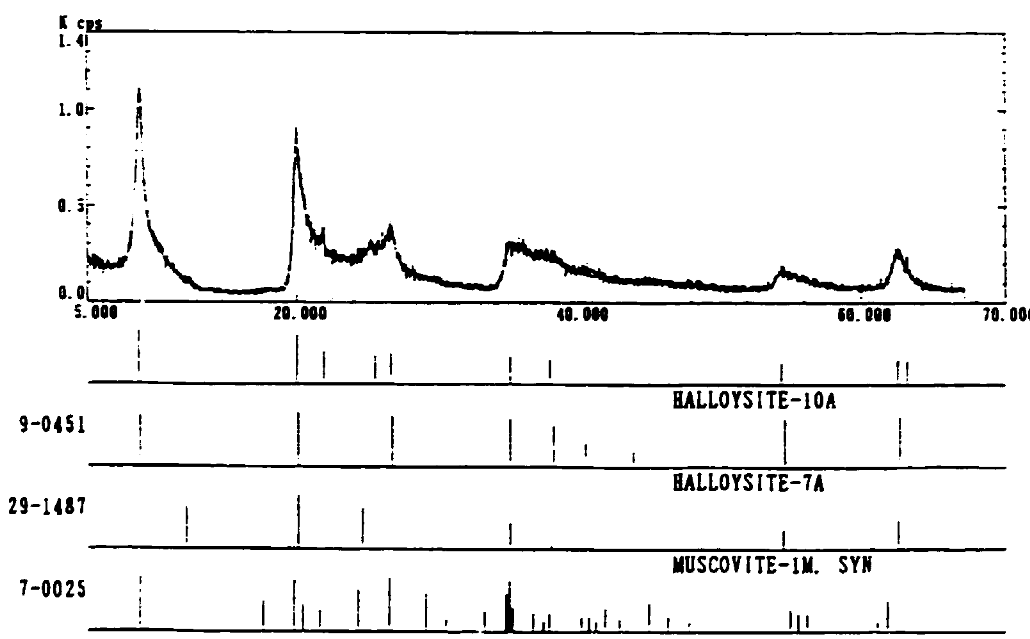
Location : Mat-i, Claveria, & Ginoog, Misamis Oriental
Reserve : 2.5 million MT as estimated by MGB
Supplier : Mr. Tony Parba
Status of
Operation : No operation, property is still prospect



# X-RAY ANALYSIS

TAGURANAO WHITE CLAY

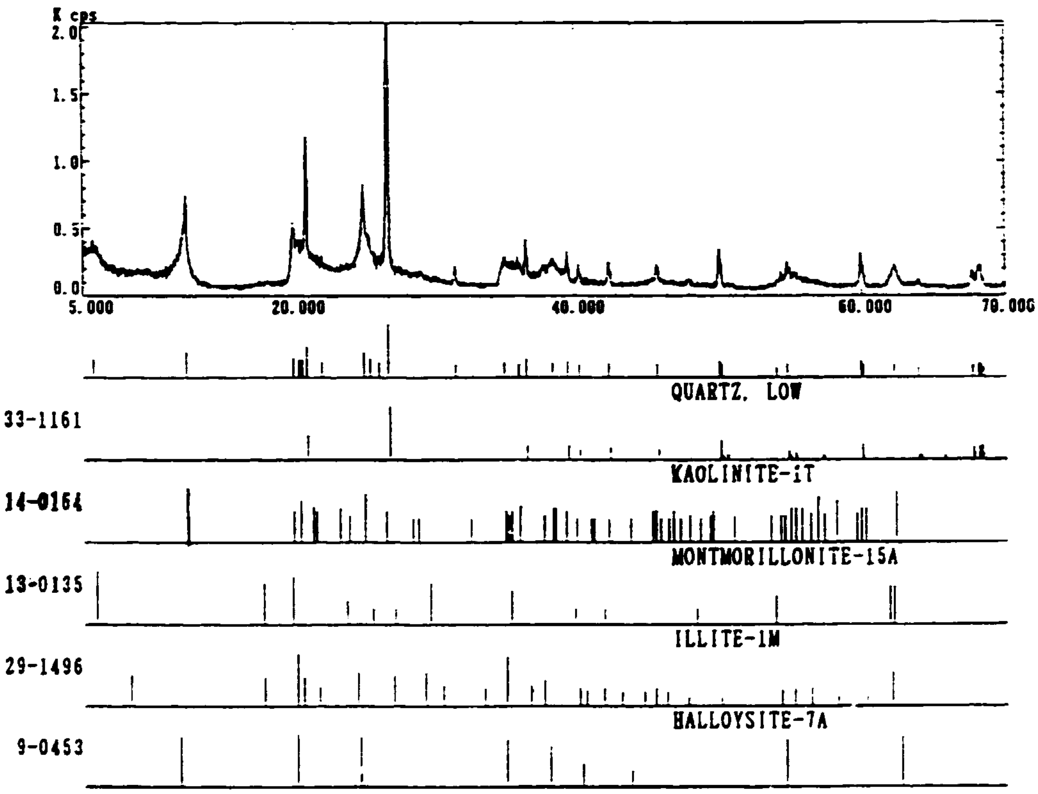
Location : Mt. Talomo, Taguranao, Davao City
Reserve : No data yet but estimated at 100,000MT, pos-
Supplier : sible
Status of Proculu Fuentes III, Davao City
Operation :
No operation, still a prospect



# X-RAY ANALYSIS

SAN DIONISIO BALL CLAY

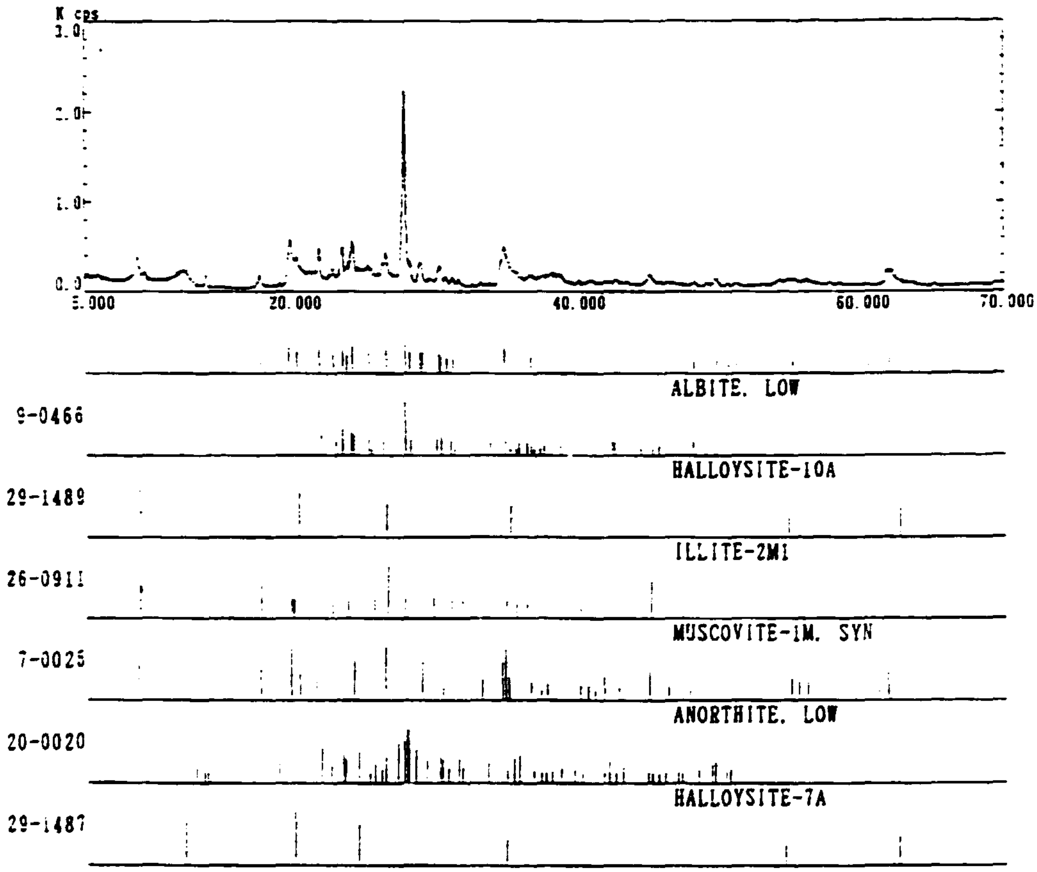
Location : Barrio Capinang, San Dionisio, Iloilo
Reserve : 2 million MT possible reserve
Supplier : Venancio Cudilla 102 Gen Luna St., Iloilo City



# X-RAY ANALYSIS

STA. ELENA WHITE CLAY

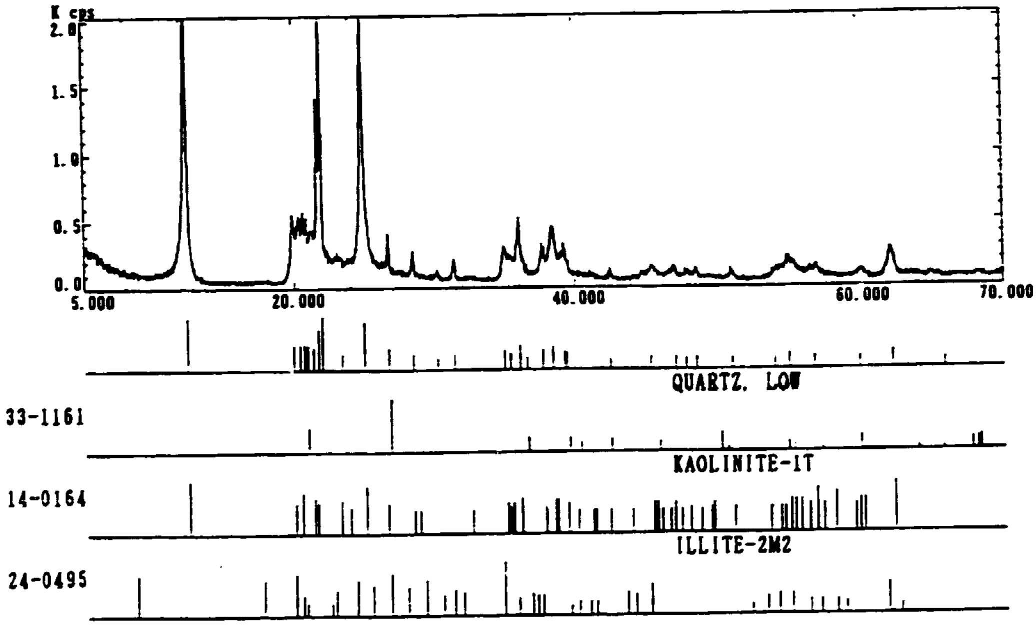
Location : Sta. Elena, Camarines Norte, beside the Bulala Flint Clay property of Firestone Ceramics
Reserve : No exploration data yet; reconnaissance survey indicate high potential
Supplier : Mr. Ramon S. Reyes, Lucena City
Status of Operation : No operation, property is still a prospect



# X-RAY ANALYSIS

SINUKNIPAN BALL CLAY

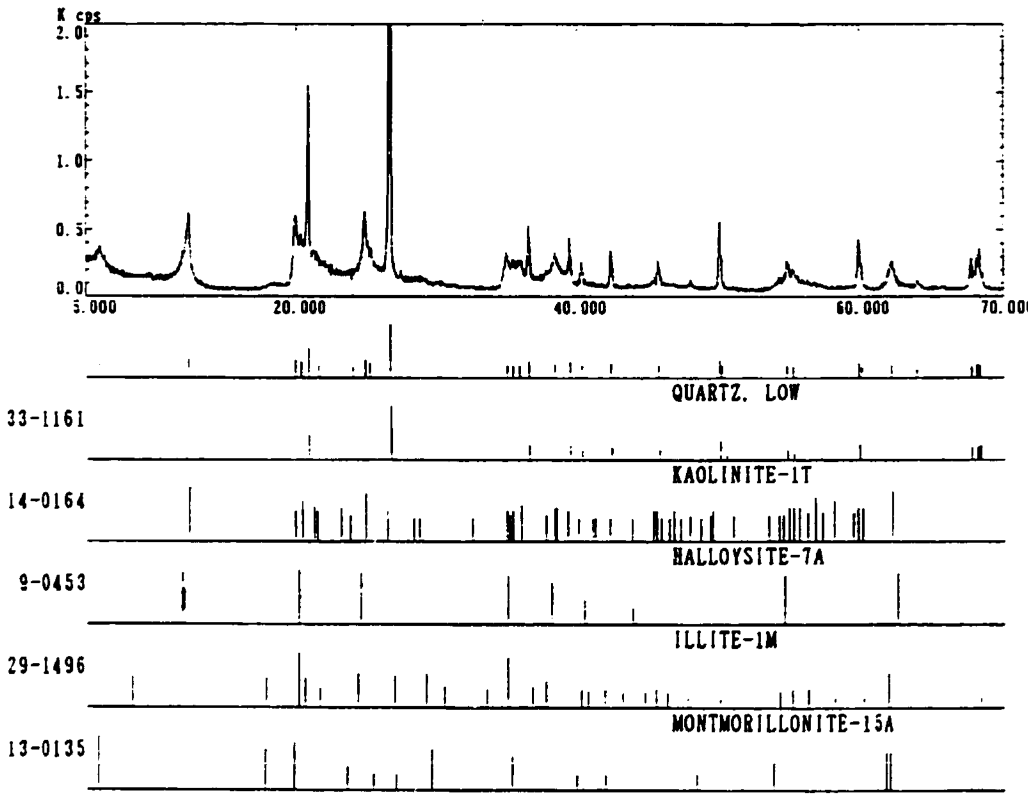
Location : Siniknipan & Del Gallego, Camarines Sur
Reserve : Possible reserve, 1.2 million MT
Supplier : Mr. Romeo Mercado, c/o Tony Alvarez, Paco Station, PNR



# X-RAY ANALYSIS

LEMERY BALL CLAY

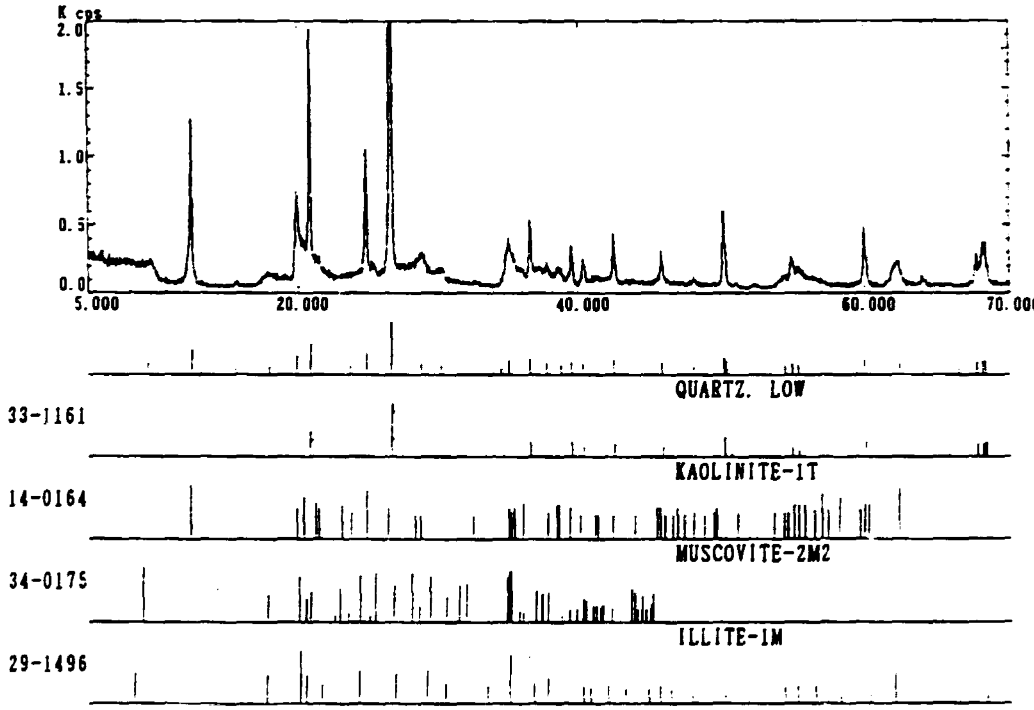
Location : Barrios Gerongan & Buenavista, Lemery, Iloilo City
Reserve : No data but estimated at 1,000 MT possible
Supplier : Emilio Evangelista, 28 San Jose, Iloilo C.



# X-RAY ANALYSIS

NORTH GIGANTES WHITE CLAY

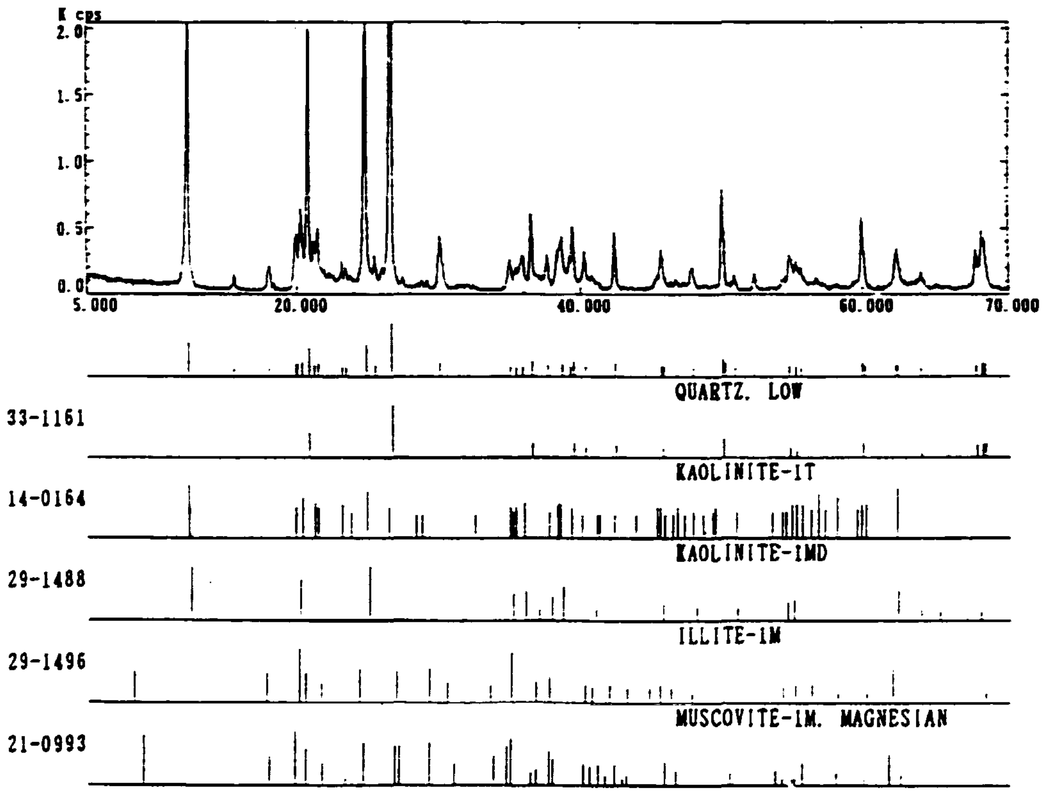
Location : North Gigantes Island, Carles, Iloilo
Reserve : Possible reserve estimated at 200,000 MT
Supplier : Venancio Cudilla
Status of
Operation : Stopped operation



# X-RAY ANALYSIS

DIPOLOG WHITE CLAY

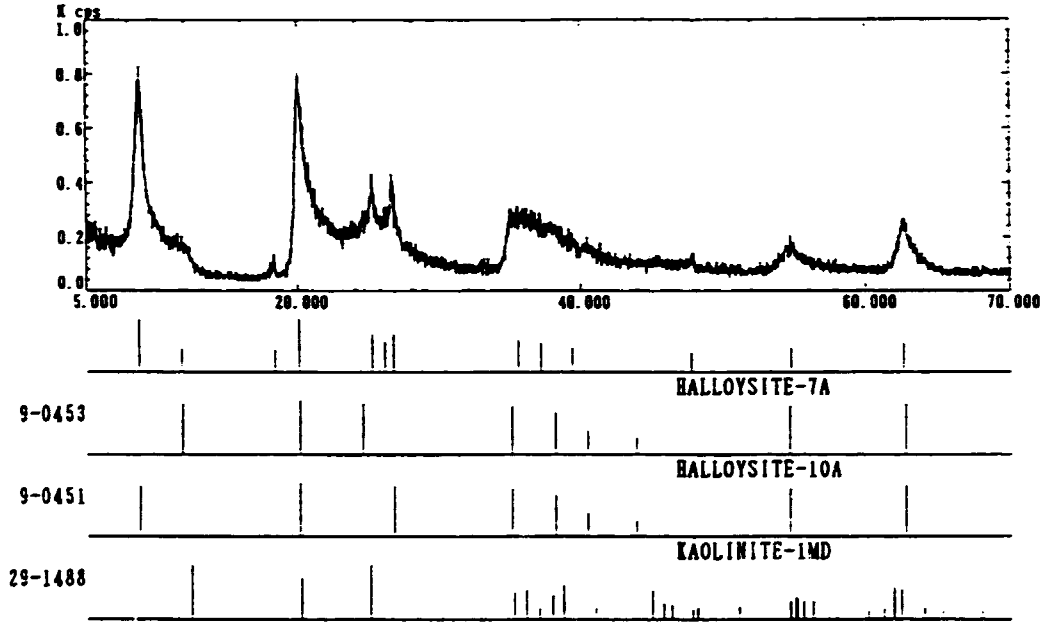
Location : Sitio Lalab, Sibutad, Zamboanga del Norte
Reserve : Possible reserve estimated at 100,000 MT; similar occurrences in neighboring towns also discovered
Supplier : Edger Cabrera, IRA Mining, Iligan City
Status of Operation : Now operating, unsystematic small-scale mining



# X-RAY ANALYSIS

MARAWI BALL CLAY

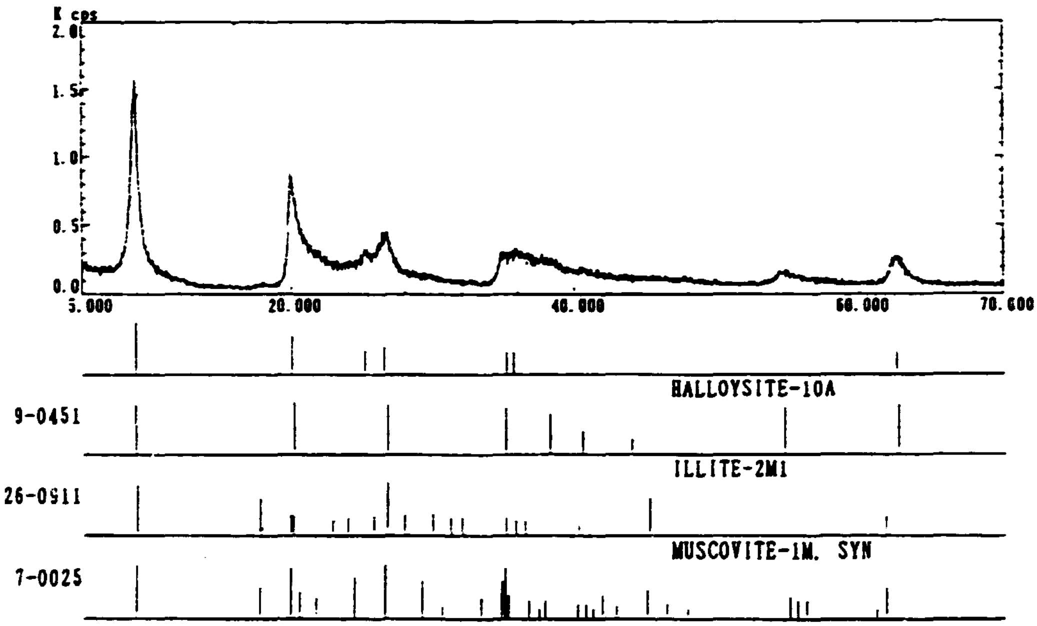
| | |
|---|---|
| Location | : Barrio Bangon, Ramain & Marawi City, Lanao del Sur, in a wide plane (flood plain) of Lake Lanao |
| Reserve | : possible estimated to be 1 million MT by MSRI |
| Supplier | : Atty. Abdullah D. Mama-o, Marawi City |
| Status of Operation | : No operation, property is still a prospect |



# X-RAY ANALYSIS

MALITBOG WHITE CLAY

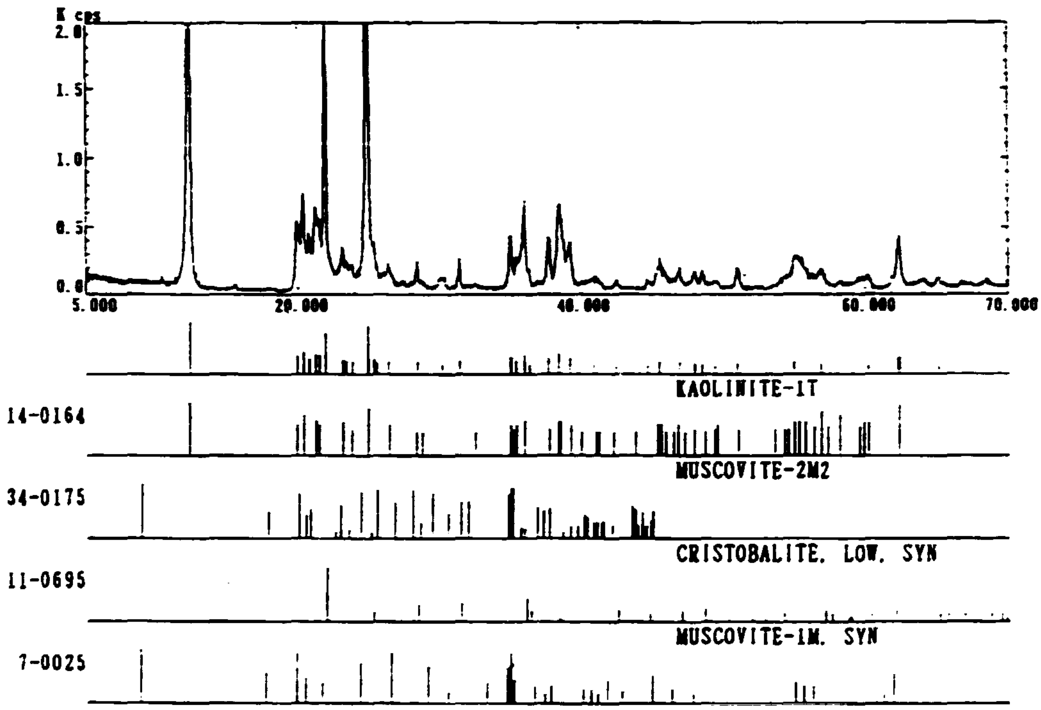
Location : Malitbog, Bukidnon
Reserve : No data yet but reported to beas extensive as Talakag WC
Supplier : Mr. Gador, Cagayan de Oro City
Status of Operation : No operation, still a prospect



# X-RAY ANALYSIS

MAGPET WHITE CLAY

Location : Barrio Inac & Doles, Magpet, North Cotabato
Reserve : 525,000 MT possible reserve
Supplier : Mr. Desiderio Go ; Virgo Camtrade, Devao C.
Status of
Operation : Stopped operation



# X-RAY ANALYSIS

INFANTA WHITE CLAY

Location : Infanta, Pangasinan
Reserve : No estimate by Bureau of Mines, must be large as this is one of the main source of clay by Luzon ceramic plants

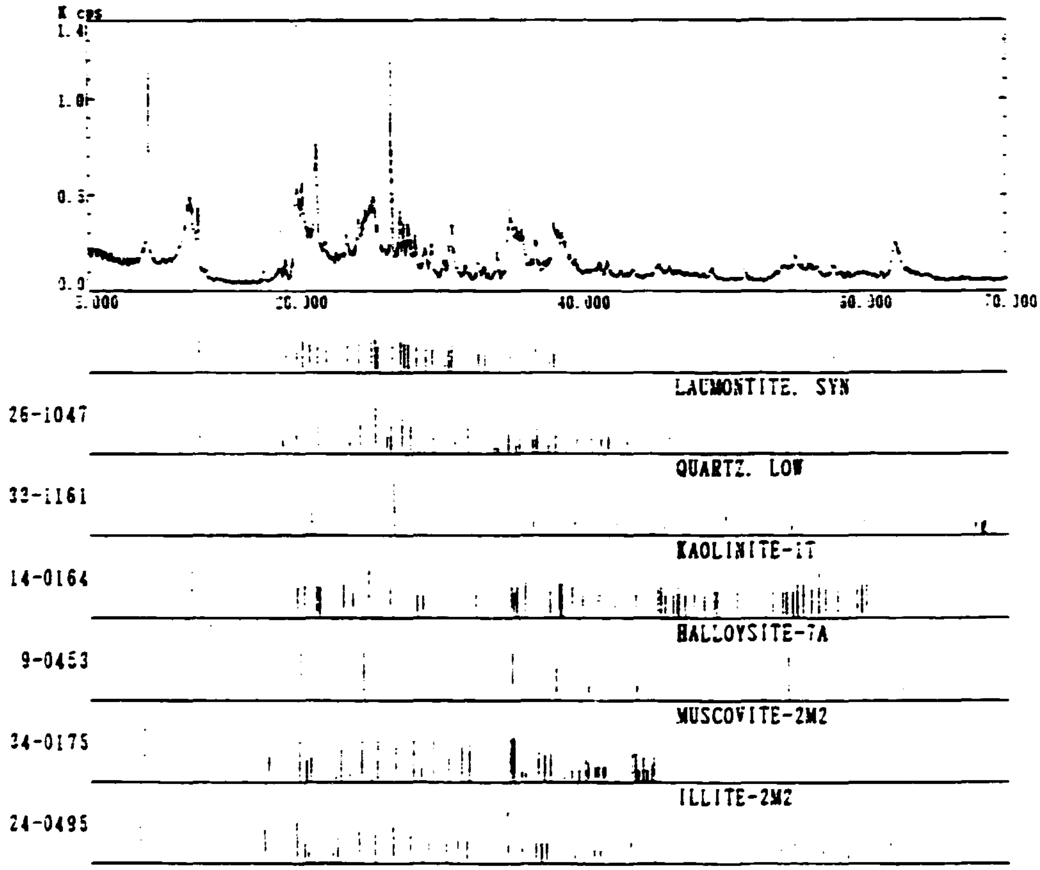


TABLE - AN-3-1/1

PRODUCTION COST

Unit: Peso1,000

| Period | Construct | Start up | | | | Full Capacity Year | | |
|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% |
| Raw materials | --- | 69,020 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 |
| Utilities | --- | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 |
| Personal | --- | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 |
| Spare parts | --- | 1,440 | 2,401 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 |
| Maintenance | --- | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 |
| Technical fee | --- | 5,987 | 5,107 | 5,107 | 8,936 | 8,936 | 8,936 | 0 |
| Factory over head | --- | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 |
| Factory cost | 0 | 90,932 | 108,267 | 109,707 | 113,536 | 113,536 | 113,536 | 104,600 |
| Administrative over head | --- | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 |
| Sales & Distribution | --- | 5,466 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 |
| Operation cost | | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 |
| Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 |
| Depreciation | --- | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 | 37,268 |
| Total Production cost | 0 | 207,178 | 225,879 | 215,349 | 207,208 | 195,238 | 183,268 | 162,362 |

TABLE - AN-3-1/2

PRODUCTION COST

| Period<br>Year<br>Production Program | 9<br>100% | 10<br>100% | 11<br>100% | 12<br>100% | 13<br>100% | 14<br>100% | 15<br>100% | 16<br>100% |
|---|---|---|---|---|---|---|---|---|
| Raw materials | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 | 86,274 |
| Utilities | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 | 9,374 |
| Personal | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 | 2,859 |
| Spare parts | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 | 3,841 |
| Maintenance | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 |
| Technical fee | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Factory over head | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 | 1,132 |
| Factory cost | 104,600 | 104,600 | 104,600 | 104,600 | 104,600 | 104,600 | 104,600 | 104,600 |
| Administrative over head | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 | 1,692 |
| Sales & Distribution | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 | 6,832 |
| Operation cost | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 |
| Interest | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Depreciation | 37,068 | 37,068 | 37,068 | 2,063 | 2,063 | 2,063 | 2,063 | 2,063 |
| Total Production cost | 150,192 | 150,192 | 150,192 | 115,187 | 115,187 | 115,187 | 115,187 | 115,187 |

TABLE - AN-3-2/1

NET INCOME STATEMENT Unit: Peso1,000

| Period | Construct | Start up | Full Capacity Year | | | | | |
|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Production Program | | 80% | 100% | 100% | 100% | 100% | 100% | 100% |
| 1. Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| 2. Production Cost | 0 | 207,178 | 225,879 | 215,349 | 207,208 | 195,238 | 183,268 | 162,362 |
| 3. Gross profit (before tax) | 0 | -2,917 | 29,447 | 39,977 | 48,118 | 60,088 | 72,058 | 92,964 |
| 4. Income tax(35%) | 0 | 0 | 10,306 | 13,992 | 16,841 | 21,031 | 25,220 | 32,537 |
| 5. Net profit (after tax) | 0 | -2,917 | 19,141 | 25,985 | 31,277 | 39,057 | 46,838 | 60,427 |
| 6. Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 |
| 7. Undestributed Profit | 0 | -2,917 | 19,141 | 13,815 | 13,022 | 14,717 | 22,498 | 23,917 |
| 8. Accumulated Undestributed Profit | 0 | -2,917 | 16,224 | 30,039 | 43,060 | 57,778 | 80,275 | 104,192 |
| Ratio | | | | | | | | |
| Gross Profit: Sales(%) | --- | -1% | 12% | 16% | 19% | 24% | 28% | 36% |
| Net Profit: Sales(%) | --- | -1% | 7% | 10% | 12% | 15% | 18% | 24% |
| Net Profit: Equity(%) | --- | -2% | 16% | 21% | 26% | 32% | 38% | 50% |

Peso 121,700 .-

TABLE - AN-3-2/2

NET INCOME STATEMENT

| Period<br>Year<br>Production Program | 9<br>100% | 10<br>100% | 11<br>100% | 12<br>100% | 13<br>100% | 14<br>100% | 15<br>100% | 16<br>100% |
|---|---|---|---|---|---|---|---|---|
| 1. Sales revenue | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| 2. Production Cost | 150,192 | 150,192 | 150,192 | 115,187 | 115,187 | 115,187 | 115,187 | 115,187 |
| 3. Gross profit (before tax) | 105,134 | 105,134 | 105,134 | 140,139 | 140,139 | 140,139 | 140,139 | 140,139 |
| 4. Income tax(35%) | 36,797 | 36,797 | 36,797 | 49,049 | 49,049 | 49,049 | 49,049 | 49,049 |
| 5. Net profit (after tax) | 68,337 | 68,337 | 68,337 | 91,090 | 91,090 | 91,090 | 91,090 | 91,090 |
| 6. Dividend | 48,680 | 48,680 | 48,680 | .48,680 | 48,680 | 48,680 | 48,680 | 48,680 |
| 7. Undestributed Profit | 19,657 | 19,657 | 19,657 | 42,410 | 42,410 | 42,410 | 42,410 | 12,410 |
| 8. Accumulated Undestributed Profit | 123,849 | 143,506 | 163,163 | 205,573 | 247,984 | 290,394 | 332,805 | 375,215 |
| Ratio | | | | | | | | |
| Gross Profit: Sales(%) | 41% | 41% | 41% | 55% | 55% | 55% | 55% | 55% |
| Net Profit: Sales(%) | 27% | 27% | 27% | 36% | 36% | 36% | 36% | 36% |
| Net Profit: Equity(%) | 56% | 56% | 56% | 75% | 75% | 75% | 75% | 75% |
| Peso | 121,700 .- | | | | | | | |

TABLE - AN-3-3/1

INTERNAL RATE OF RETURN ON INVESTMENT

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | |
| b) Operation cost | 0 | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 |
| Gross cash inflow | 0 | 106,171 | 138,535 | 137,095 | 133,266 | 133,266 | 133,266 | 142,202 |
| Income tax(35%) | - | 0 | 10,306 | 13,992 | 16,841 | 21,031 | 25,220 | 32,537 |
| Net cash inflow | 0 | 106,171 | 128,229 | 123,103 | 116,425 | 112,235 | 108,046 | 109,665 |
| Net Present Value(21%) | | 87,740 | 87,580 | 69,492 | 54,312 | 43,267 | 34,423 | 28,875 |

Reclaim

Investment Peso463,700.-

TABLE - AN 3-3/2

INTERNAL RATE OF RETURN ON INVESTMENT

| | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | |
| a) Sales revenue | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | |
| b) Operation cost | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 |
| Gross cash inflow | 142,202 | 142,202 | 142,202 | 142,202 | 142,202 | 142,202 | 142,202 | 142,202 |
| Income tax(35%) | 36,797 | 36,797 | 36,797 | 49,049 | 49,049 | 49,049 | 49,049 | 49,049 |
| Net cash inflow | 105,405 | 105,405 | 105,405 | 93,153 | 93,153 | 93,153 | 93,153 | 93,153 |
| Net Present Value(21%) | 22,936 | 18,952 | 15,663 | 11,439 | 9,455 | 7,816 | 8,322 | 5,339 |
| | | | | | | N.P.V. Total = | | 505,611 |
| Reclaim | | | | | | | | 38,290 |
| | | | | | | | N.P.V.: | 5,690 |

IRROI : Before tax : 27.49%
IRROI : After tax : 23.33%

TABLE - AN-3-4/1

INTERNAL RATE OF RETURN ON EQUITY

Unit: Peso1,000

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | |
| a) Sales revenue | 0 | 204,261 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | |
| b) Operation cost | 0 | 98,090 | 116,791 | 118,231 | 122,060 | 122,060 | 122,060 | 113,124 |
| c) Interest | --- | 71,820 | 71,820 | 59,850 | 47,880 | 35,910 | 23,940 | 11,970 |
| d) Repayment | - | - | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 | 57,000 |
| Total (b+c+d) | 0 | 169,910 | 245,611 | 235,081 | 226,940 | 214,970 | 203,000 | 182,094 |
| Net cash inflow | 0 | 34,351 | 9,715 | 20,245 | 28,386 | 40,356 | 52,326 | 73,232 |
| Income tax(35%) | - | 0 | 10,306 | 13,992 | 16,841 | 21,031 | 25,220 | 32,537 |
| Retained cash | 0 | 34,351 | -591 | 6,253 | 11,545 | 19,325 | 27,106 | 40,695 |
| Net Present Value(21%) | | 28,388 | -404 | 3,530 | 5,386 | 7,450 | 8,636 | 10,715 |
| Reclaim | | | | | | | | |
| Dividend | 0 | 0 | 0 | 12,170 | 18,255 | 24,340 | 24,340 | 36,510 |
| Retained cash after dividend | 0 | 34,351 | -591 | -5,917 | -6,710 | -5,015 | 2,766 | 4,185 |
| Accumulated cash | 0 | 34,351 | 33,760 | 27,843 | 21,132 | 16,118 | 18,883 | 23,068 |

Equity Peso121,700.-

TABLE - AN-3-4/2

INTERNAL RATE OF RETURN ON EQUITY

| | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| Cash Inflow | | | | | | | | |
| a) Sales revenue | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 | 255,326 |
| Cash outflow | | | | | | | | |
| b) Operation cost | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 |
| c) Interest | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| d) Repayment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total (b+c+d) | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 | 113,124 |
| Net cash inflow | 142,202 | 142,202 | 142,202 | 142,202 | 142,202 | 142,202 | 142,202 | 142,202 |
| Income tax(35%) | 36,797 | 36,797 | 36,797 | 49,049 | 49,049 | 49,049 | 49,049 | 49,049 |
| Retained cash | 105,405 | 105,405 | 105,405 | 93,153 | 93,153 | 93,153 | 93,153 | 93,153 |
| Net Present Value(21%) | 22,936 | 18,952 | 15,663 | 11,439 | 9,455 | 7,816 | 8,322 | 5,339 |
| | | | | | | N.P.V. Total = | | 163,623 |
| Reclaim | | | | | | | | 38,290 |
| | | | | | | | N.P.V.: | 5,690 |
| Dividend | 48,680 | 48,680 | 48,680 | 48,680 | 48,680 | 48,680 | 48,680 | 48,680 |
| Retained cash after dividend | 56,725 | 56,725 | 56,725 | 44,473 | 44,473 | 44,473 | 44,473 | 44,473 |
| Accumulated cash | 79,793 | 136,518 | 193,243 | 237,716 | 282,190 | 326,663 | 371,137 | 415,610 |

IRROE : After tax : 25.94%