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UNIDO

CONTRACT NO. 92/081
PROJECT NO. US/UT/RAF/91/173

20882

DIAGNOSTIC STUDY

OF

PREMIUM OIL INDUSTRIES LIMITED
LUSAKA, ZAMBIA

FINAL REPORT

BANGALORE - INDIA JUNE 1993

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UNIDO CONTRACT NO. 92/081

PROJECT NO. US/UT/RAF/91/173

ACTIVITY CODE: J12207

REHABILITATION OF INDUSTRIAL ENTERPRISES IN EAST AFRICA

REPORT ON

PREMIUM OIL INDUSTRIES LIMITED

LUSAKA, ZAMBIA

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DATE OF REPORT: JULY, 1993

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SYNOPSIS

Premium Oil Industries Limited (POI)in Lusaka, Zambia was one of the enterprises selected for study in consultation with the Zambian Ministry of Commerce and Industry and the UNIDO office. After 40 man-days of study, and rendering direct assistance as needed, Amarnath Kamath & Co. (AKC), Management Consultants are of the opinion that POI deserves serious consideration for industrial rehabilitation for the following reasons:

1. The market for edible oils in Zambia and in the surrounding countries is growing.

2. POI has a fairly modern plant.

3. POI has fairly competent middle management.

POI has immense potential to contribute in a meaningful manner to the growth and prosperity of the Zambian agrarian economy.

RECOMMENDED REHABILITATION STRATEGIES

A. Activities in the short term to improve profitability

1. There is an urgent need to upgrade and refurbish the process plant and equipment. This should ideally be entrusted to a competent external agency, on a limited period contract. During this time a strong engineering team should be built at POI, through rigorous on-the-job training under the supervision of the organisation undertaking the rehabilitation.

2. POI should implement the process changes suggested later in this report.

3. After careful job study it was proposed that excess staff in the administration, human resources and purchasing departments should either be retrenched or transferred to other departments.

4. The manager in charge of stores should have independent charge and report directly to the General Manager. Systems should be developed which will control and eradicate practices that encourage corruption.

B. Activities in the medium term to improve profitability

1. An in-house job training facility is necessary. Employees undergoing specific job betterment programmes will naturally improve the quality of production. Boosting employee morale will be a secondary but necessary benefit.

2. POI should increase the oil-seeds procurement programme on a regular basis and target to reduce import of crude vegetable oil drastically.

I. EXECUTIVE SUMMARY

Premium Oil Industries Limited (POI) commenced its operations in 1964 as Refined Oil Products Limited, a subsidiary of the Rhodesia Industries, with headquarters in Salisbury (now Harare).

Initial operations included crushing of cotton and groundnut seeds, oil refining, the manufacture of candles, several brands of laundry soaps, toilet soaps, liquid soaps, detergents and glycerine, washing soda, margarine and hard fats for the baking industry.

In 1975, in the wake of the Government's nationalisation policy, both Refined Oil Products Ltd., with its factory in Lusaka, and Lever Brothers Ltd. (a Unilever subsidiary), with its factory in Ndola, were nationalised, with the Government controlling 100% of the shares through Indeco Ltd., a public sector undertaking. The two companies, engaged in similar activities, were then merged under ROP Ltd., with headquarters based at Ndola and factories at Ndola and Lusaka.

In April 1976, the vegetable oil seed processing operations were expanded at the Lusaka factory with the commissioning of the 'CARVER' plant which could process 100 M.T. of oil seeds per day. In 1977, the oil refining operations were expanded with the commissioning of a new refinery which could refine 100 M.T. of oil per day.

Further expansions in 1980 saw the commissioning of the 'BUHLER' seed crushing plant which had a capacity to process 300 M.T. of seeds per day rendering the 'CARVER' plant superfluous. The latter plant was progressively cannibalised to such an extent that presently it has been consigned to the scrap heap.

In the Buhler plant, oil was extracted through the process of deep pressing. This process resulted in a substantial amount of residual oil being left in the spent cake. To recover this residual oil POI installed a solvent extraction plant capable of processing 180 metric tonnes of oil cake per day. This was sourced from Italy and commissioned in October 1982.

In July 1986, the factory at Lusaka was delinked from ROP (1975) Ltd. and incorporated as an independent company, under the banner of Premium Oil Industries Ltd.(POI). Today, POI is the largest edible oil refining factory in Zambia and continues to be wholly owned by INDECO Ltd., which in turn is a wholly owned subsidiary of ZIMCO (Zambia Industrial Mining Corporation Ltd.)

The problems of POI arise from the following:

i. Investment decisions on plant and machinery taken without adequate study and justification:

* Cotton seed processing plant imported from China at an approximate cost of US $1.0 Million still remains in its original crates.

* Modifications carried out on solvent extraction plant to enhance its process capacity, without adequate study of the imbalances that may be created in other areas.

* Pelletisation plant procured for pelletising the seed hull remains inoperative. The pelletised seed hull was to have been used as a supplement to the boiler fuel.

ii. Poor maintenance, coupled with lack of spare parts, has resulted in frequent breakdowns and consequent under-utilisation of plant capacity.

iii. Frequent changes in senior management deprives the Company of continuity in leadership. The present General Manager has been in this position for less than a year and in the past three years there have been three General Managers, none of whom have had any previous experience in the oil processing industry.

iv. Poor process control and operating practices resulting in material wastage far above acceptable norms.

v. 60% of oil production is based on imported crude - a major drain on precious foreign exchange. Imported crude has to be used because of the inefficiency and the frequent breakdown of the seed processing unit.

vi. The under utilisation of the seed-processing unit results in low production of seed cake, a profitable product which is in high demand for livestock production.

The Company's range of products, covering edible vegetable oil, stock feed cake (from soya and sunflower seeds), margarine, bakery fats and glycerine have a good market, but their quality and packaging need substantial improvement, as presently they do not compare favourably with imported products from neighbouring countries like Zimbabwe and South Africa.

Though POI has 460 employees it has no training programmes. Morale among mill level managers, staff and workers is low. This may be attributed to frequent changes in leadership. The Company does not have an incentive schemes for employees, linked either to productivity or to performance.

The critical area to be tackled is clearly in **"ENGINEERING AND MAINTENANCE"** and therefore the SC's time at POI was devoted mainly to study problems related to material storage and bottlenecks in processing, identification of specific causes for machinery breakdowns and providing respective recommendations for action plans to overcome these shortcomings. A comprehensive plant maintenance and machinery rehabilitation programme, based on identified bottlenecks, has been worked out in consultation with the production and engineering managers. (See Annexures II and III.

It is also quite clear that the existing team at the POI does not possess the requisite skills and overall competence to carry out the rehabilitation programme. The SC has therefore recommended that this exercise could be entrusted to an outside organisation on contract for a period of about three years, during which time a strong engineering team could be built up by POI through rigorous on the job training under the supervision of the selected contracting firm. It has been further recommended that the contractor's scope of work should also include the setting up of an in-company TRAINING SCHOOL so that two important objectives could be achieved during the period of the contract -

* The efficiency of the plant could be improved to enable it to achieve the rated capacity.

* The Company could build a strong team of engineers and technicians who can subsequently operate and maintain the plant & machinery at a high level of efficiency.

The Consultants are willing to assist in identifying and short-listing competent organisations, with proven track records, to undertake the contract for the rehabilitation and training programme and submit them to POI for their final selection. The rehabilitation programme envisages repair of the existing machinery, without any major capital expenditure and is aimed at progressive elimination of the present practice of importing crude oil for refining, at the cost of considerable foreign exchange. Increased procurement and processing of locally grown seeds will yield economic benefits through increased output of stock feed - a major input for livestock production and an added incentive to the farming community to enhance their output.

POI can have a substantial impact on the Zambian agricultural and livestock economy. It can promote the growth of oil seeds and improve the farm economy and by increasing the throughput of seedcake it can also improve the supply of livestock feed.

II. PREAMBLE

INTRODUCTION

On October 9, 1992, Messrs. Amarnath Kamath & Co., Management Consultants, signed contract no. 92/081 with UNIDO, in Vienna, to provide services for carrying out a project entitled **"REHABILITATION OF INDUSTRIAL ENTERPRISES"** in the East African countries of Tanzania, Uganda & Zambia.

The objectives of the project are:

a) To advise the Government of each country and the selected enterprises, in short and medium term, on measures to rehabilitate them and to provide direct assistance during the diagnostic analysis.

b) To encourage and define possibilities and means for enterprise to enterprise co-operation between the industrial enterprises audited and similar enterprises in India for transfer of technology and technical assistance.

The following is the scope of work, objective-wise:

1. Objective (a)

   i) Diagnostic reports to be prepared for the enterprises audited and extend adhoc direct assistance to them.

   ii) Provision of direct assistance to improve management systems and productivity of manpower and equipment in the enterprises.

2. Objective (b)

A report to be prepared containing:

i) the approach and procedures for maintaining enterprise to enterprise cooperation between the industrial enterprises in East Africa and industrial enterprises in India.

ii) a list of opportunities of enterprise to enterprise cooperation identified during the implementation of the project.

A progress report and a draft final report have been submitted, documenting the activities of our consultants. This is the final report of the study undertaken by us in Premium Oil Industries Ltd.

III. CONSULTING METHODOLOGY

SCOPE OF WORK

A Senior Consultant (SC) of M/s. Amarnath Kamath & Co. with more than thirty-four years of industrial experience, out of which twelve years were in Africa especially in the area of corporate turnaround of sick industries, was stationed in Zambia for 8 weeks. The details of PREMIUM OIL INDUSTRIES (POI) were collected through meetings and in-plant inspections held periodically with management and staff at various levels.

Out of the 8 weeks in Lusaka, approximately 4 weeks were spent with POI, during which period several rounds of management meetings were convened with the various operational departments, such as Production, Engineering, Quality Control, Marketing, Human Resources Development, Finance and Accounts and Purchase and Supplies.

The agenda for the meetings were prepared and circulated by the SC to all the participants of the meeting, well in advance, with a detailed questionnaire covering the key areas of operation in the concerned departments. Problem areas were identified during the meetings and recommendations were made by the SC through active participation of the key members of the section.

Meetings were also held with important officials of

- the Ministry of Industry
- the Ministry of Agriculture
- the Food & Agricultural Organisation of the United Nations

The list of people/organisations contacted during the study is given in Annexure I.

The SC was further supported by the Team Leader for two weeks and a Technical Consultant for one week.

After the initial study, it became apparent that the critical problem areas for the Company revolved around -

* Inefficient and under-utilisation of plant and process equipment and poor maintenance and engineering practices

* Poor management of human resources resulting in low morale and consequent loss in productivity

It was, therefore, against this background that the SC decided to organise seminars for the senior and middle management personnel covering these areas of weakness within the organisation.

Two half-day seminars were organised in consultation with the General Manager and the assistance and coordination of the department of Human Resources Development. The following were the themes and content of the respective programmes:

Theme - **"Improving the use of Capital Resources"**

Areas covered:
Waste reduction and energy conservation programmes
Maintenance improvement
Improving productivity through quality

Theme - **"Effective Human Resources Management"**

Areas covered:

The role of management	Manpower motivation
Worker's participation	Productivity training
Work organisation	

The seminars were conducted by using flip charts which were prepared by engaging a part-time draughtsman from one of the local architect companies and fabricating a wooden stand for the flip charts through the services of a local carpenter. It was necessary to make this improvisation, as neither Premium Oil, nor the local UNIDO and ILO offices were able to provide flip-chart stands or over-head projectors.

A lively question-answer session followed both the presentations.

It has been suggested to the management that it would be beneficial for them to conduct seminars/workshops at least once a month covering areas that have been clearly identified so that opportunities are given to employees who participate to express themselves freely in an atmosphere which is free from any reservation or fear.

Mr. A. Kamath, Chief Executive, Messrs. Amarnath Kamath & Co., Bangalore, India and Mr. C.R. Seetharam, Team Leader, returned to Zambia on May 10, 1993. They presented the draft final report to officials of the Zambian Ministry of Commerce and Industry, the UNIDO Country Director, Deputy High Commissioner of India and to Premium Oil officials in Lusaka on May 12, 1993. Observations and comments received on the draft final report, and updated information made available have been incorporated in this final report.

IV. BACKGROUND

1.0 ZAMBIA - COUNTRY BACKGROUND

1.1 Demographic outline

Formerly known as Northern Rhodesia, Zambia takes its name from the Zambezi river which rises in the northwestern corner of the country and forms most of its southern boundary. Zambia is a large, landlocked country (752,614 sq. kms.), located 18 degrees south of the equator. Zambia is bordered by Zaire and Tanzania in the north and northeast, Malawi and Mozambique on the east, Zimbabwe on the south, Namibia via the Caprivi Strip and Angola on the west.

Although there is climatic variation from the semi-arid western region to the swampy Lake Bangweli area in the northeast, most of Zambia lies on a plateau with height between 3500 and 4500 feet above mean sea level. The plateau is broken-up by the wide valleys of the upper Zambezi and its major tributaries of which the Kafue and Luangwa Rivers are the largest. Near Livingstone, the Zambezi river passes over the Victoria falls and then enters Lake Kariba, the world's largest man-made lake, which is formed by a dam at Kariba gorge.

Zambia has three distinct seasons: cool and dry from May to August, hot and dry from September to November and warm and wet from December to April. The high altitude tempers the humidity so that the climate is generally pleasant. Climatic conditions also make possible the cultivation of a wide range of crops: corn, tobacco, cotton, rice and wheat, both tropical and citrus fruits, a wide variety of vegetables, tea and coffee and flowers. The average annual rainfall is 32 cm. and the temperature varies between 10 & 32 degrees Centigrade or 50 & 89 degrees Fahrenheit.

The population in 1991 was estimated at 8.21 million. The crude birth rate has remained almost static since 1960 at around 50 per 1,000. Almost one half of the Zambian population is urban, the largest urbanised population in Africa. The majority of the other half are subsistence farmers. About one fifth of the population lives in the copper belt towns - KITWE (440,000), NDOLA (380,000), MUFULIRA (175,000), CHINGOLA (187,000), LUANSHYA (148,000). Lusaka, however has the largest population (approx. 1.0 million). Outside the copper belt, KABWE with 167,000 and Livingstone with 84,000 are the other large urban areas.

1.2 Structure of the economy

Zambia achieved independence in 1964. Dr. Kenneth Kaunda was Zambia's president for the first 27 years. In October 1991, Zambia held its first multi-party elections and elected its new president, Mr. Frederick J. Chiluba, with an overwhelming majority.

Zambia is a leading producer of copper and cobalt, which together comprise 85 % of its exports. This situation renders the economy particularly susceptible to world economic trends. Over dependence on copper at the expense of agriculture, manufacturing and tourism has proved to be a major pitfall. The money earned from export of copper was used to build a consumption subsidised economy at the expense of local production. Food at one point was subsidised to the tune of 80 %. When copper prices crashed, the government turned to massive external borrowings to keep this consumption subsidised economy going. When the time came to pay up, the government was unable to meet its commitments and was forced to implement World Bank and IMF backed programmes. These called for reduction in subsidies, especially on food, to keep the aid trickling in.

The state sector dominated the economy, running some 120 companies ranging in size from the giant Zambia Consolidated Copper Mines (ZCCM) to breweries, small bakers, travel agencies, tile units, stone crushing, meat factories, etc.

The economy has been plummeting over the years, recording negative growth rates in the past few years. Real GDP declined by 1 % in 1989, by 0.5 % in 1990 and 1.8 % in 1991. During the same period, the per capita GDP slid even more alarmingly, it registered a negative growth of 4.4 % in 1989, of 3.9 % in 1990 and 5.1% in 1991. This decline is highlighted against the background of Zambia having had the third highest per capita income in Africa, after South Africa and Egypt, at the time of independence in 1964. The drought, the first in Zambia in many years, has been an unexpected set-back for the new government which had strived hard to put the economy back on rails. The real GDP is likely to decline by 9 % in 1992.

1.3 Debt

The gross external debt of Zambia as on December 31, 1990 was in excess of US $ 7 billion. This made Zambia, with a population of eight million, one of the world's highest per capita indebted (US $ 800/900 per capita) countries. Debt service ratios have been gradually mounting from 58 % in 1989 to 60 % in 1990, 65 % in 1991 and is expected to touch 66.2 % in 1992.

1.4 Currency

Responding to pressure from IMF, the Government introduced a weekly foreign exchange auction in October 1985 to allocate funds for imports and set the exchange rate for all foreign currency

transactions. The first auction resulted in a 56 % devaluation of the Kwacha whereby K 5.01 = US$ 1.00 and the trend thereafter was steadily downward.

In July 1989, the Government announced that old currency notes would be withdrawn and replaced by new ones, at par. A 13 day period was allowed for the changeover, the third since independence, during which the borders were closed to prevent people trying to bring back Kwacha that had been smuggled out. On February 19, 1990, a dual exchange system came into effect: Official Exchange Rate (OER) and Market Exchange Rate (MER). OER was K 25 = US$ 1.00 and MER was K 40 = US$ 1.00

By end December 1990 OER was K 48 = US$ 1.00 and MER some 15 % higher. On May 1, 1991 the two rates were merged at K 58.8 = US$ 1.00. In the MMD's first budget in January 1992, a 30 % devaluation was announced and the rate was fixed at K 125 = US$ 1.00.

Average exchange rates

Kwacha per US Dollar

1982	1983	1984	1985	1986
0.928	1.251	1.794	2.714	7.305
1987	1988	1989	1990	1991
8.889	8.224	12.903	28.986	61.728

The Kwacha continued its downward slide in 1992, as shown below:

Exchange rates	June 1992	July 1992	Nov. 1992	Dec. 1992
Kwacha/US $	305.51	332.04	335.00	340.00

On December 19, 1992, the dual exchange rate policy was abandoned and a single market rate established.

1.5 General macro economic conditions

Inflation is by far the single biggest scourge confronting the policy makers in Zambia. The overall decline in the Zambian economy is attributed to the fact that inflation adjusted growth rate has been minuscule, when not negative, in the recent past.

Inflation which was running around 150 per cent during the third quarter of 1992 was expected to cross the 200 % mark by early 1993. It has eroded the buying power of the Kwacha, battered business, discouraged savings and more importantly may discourage prospective foreign investment. Macro economic policies followed to curb inflation have hinged upon reducing the excessive money supply in the economy.

The Bank of Zambia (BOZ), the country's central banker, introduced a number of measures to regulate money supply. It has adopted a policy of maintaining high Statutory Reserves (SR) for commercial banks. On September 14, 1992 the SR was reduced from 28.5 % to 23.5 %. Simultaneously, the Liquid Assets Ratio (LAR) was increased from 30.5 % tc 35 %. The twin measures were adopted to support the profitability of the banks and at the same time reduce money supply.

Interest rates were allowed to float free. The lending rate which was around 60% by the end of the third quarter of 1992 had already climbed to 75% by December 1992. The Government's decision to free interest rates is consistent with its policy of free market economy but when compared with the inflation rate the interest rate is still a negative rate in Zambia. Real negative interest rates in Zambia have been highly detrimental to savings. People find hoarding of goods, the best hedge against inflation.

It would appear that the biggest culprit for fueling inflation has been the government, whose expenditure has been mounting due to steep increases in salaries and wages necessary to keep pace with inflation. Failure to curb inflation is attributed to the failure of demand management, the corner stone of the macro-economic policies on which the IMF and the World Bank backed plans in Zambia rely heavily upon.

If inflation could be contained, quite a few investment avenues would open up in Zambia. Agriculture, mining and tourism are some avenues with great potential.

1.6 Privatisation

As part of its structural reform programme, the Movement for Multiparty Democracy government of Mr. Frederick J. Chiluba, launched a programme to privatise the Zambian economy. MMD had committed to privatisation in its party manifesto, which stated that "the current economic role of government as a central participant in business undertakings shall cease. Free market and not nationalisation will become the foundation stone upon which the economy under the MMD government shall operate".

The Privatisation Act 1992 was enacted by the Zambian Parliament on July 3, 1992. The Act provided for the privatisation and commercialisation of State owned enterprises, for the establishment of the Zambia Privatisation Agency (ZPA) and to define its functions and to provide for the sale of shares in state owned enterprises.

ZPA has been designated by the government as being the sole authority vested with powers to deal with the privatisation of parastatal (public sector) companies.

Another critical part of the structural reform package was the abolition of subsidies, including the highly sensitive subsidy on "mealie meal" - the country's staple diet. The government's commitment on privatisation is based on the realisation that it has neither the administrative capacity nor the economic resources to ensure that the parastatal sector which accounts for 80 % of the economy operates efficiently and effectively.

Most of the parastatals operate at less than 50 % capacity. They also need massive capital investment to rehabilitate and expand their business operations and to become viable operating enterprises. Zambia Consolidated Copper Mines (ZCCM), the country's biggest mine and the largest contributor to the national income is estimated to require in excess of half a billion dollars in terms of new investment. It is unlikely to get this type of money, if it remains within the folds of the parastatal sector.

The MMD government's privatisation programme has, however, attracted strong protests. Things were going smoothly until the government announced that in pursuance of its "no sacred lamb" approach to privatisation, ZCCM, Post & Telecommunications Corporation and Zambia Electric Supply Company would also be privatised. Protests from the Mine Workers Union of Zambia, a powerful lobby in Zambia's copper belt, predictably followed. The government was forced to concede that ZCCM would not be privatised overnight. The government has now taken a stand that while in principle ZCCM will be privatised, it will be done only after a few years, along with enterprises of national and economic importance.

Continuing drought added to the woes of the government and set back the privatisation programme to some extent. ZPA, however, has kept the time table for privatising the first tranche of 17 companies reasonably on track, upto the stage of receiving offers from potential investors. Meanwhile, some controversy arose in January 1993 about the interpretation of the term "Eligible Buyer" as contained in the Privatisation Act. This has temporarily stalled further decisions regarding the companies in the first tranche. ZPA officials feel that these "teething" problems are likely to be resolved soon.

1.7 Preferential Trade Area

The treaty establishing the Preferential Trade Area (PTA) was signed on December 21, 1981 and came into force on September 30, 1992. It presently comprises of 18 states: Angola, Burundi, Comros, Djibouti, Ethiopia, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Rwanda, Somalia, Sudan, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe.

The objectives of the PTA are:

* to promote cooperation and integration covering all fields of economic activity particularly trade, customs, industry, transport, communications, agriculture, natural resources and monetary affairs;

* to raise the standard of living of the people by fostering closer relations amongst its member states;

* to create a common market by the year 2000 in order to allow for the free movement of goods, capital and labour within the sub-region and

* to contribute to the progress and development of the other African countries.

PTA has set an agenda for itself to attain full market integration leading towards the transformation of the PTA into a Common Market for Eastern and Southern African States (COMESAS).

This will entail:

* Implementation of the monetary and fiscal policy harmonisation programme and a common investment policy;

* Streamlining the "Rules of Origin" to encourage cross-border investment and new joint ventures;

* Abolition of the "Common list" so that all commodities produced in the sub-region, including those from the indigenous small and medium scale enterprises, will have access to the common market;

* Implementation of all trade facilitation measures such as the convention on the simplification and harmonisation of customs procedures, the Road Customs Transit Declaration Document and implementation of the Automated System for customs data;

* Intensification of the programme on trade information network, supply and demand surveys, buyer/seller meetings, product adaptation, quality control, packaging and labeling and

* Establishment of the sub-regional payments union as an integrated part of COMESAS.

The gradual elimination of tariff barriers on intra-PTA trade is expected to be completed by the year 2000. Non-tariff barriers, import restrictions, advance import deposits, etc. are also to be eliminated and a common external tariff with respect to goods imported from third countries introduced. This will take place in concert with the elimination of internal tariffs. PTA assumes vital importance because it represents a community of 220 million with a total GDP of around US $70 billion. If South Africa were to enter PTA, it would bring to the trade bloc its financial and technical strengths. South African money and expertise coupled with the cheap labour and the rich natural resources of the region promises to be a winning combination. There is considerable enthusiasm in Zambia about South Africa which has already opened a trade mission in Lusaka.

Other priority areas to support market integration as highlighted in the PTA Trade and Development strategy are:

i. Increasing production of goods and services of high standard, competitive in price and quality, destined primarily for the intra-PTA market.

ii. To bring PTA economies together by providing adequate transport and communications to closely link the national markets into one common market.

iii. Assist the lesser developed countries in the PTA to industrialise much faster so as to produce more competitive goods and services for export to the PTA market.

2.0 EDIBLE OIL INDUSTRY - BACKGROUND

2.1 Major players

The national oil seeds processing capacity is estimated to be around 135,000/140,000 tonnes per annum. The largest processors, Premium Oil and ROP, account for about 71% of the total national oil extraction capacity of 140,000 M.T. The break-up would be as under:

Company	Appr. annual capacity (M.T.)	Per cent (%)
Premium Oil	70,000	50
R.O.P.	30,000	21
Medium sized units	30,000	21
Small sized units	10,000	8
Total	140,000	100

Many of the medium and small scale processing units are hand operated ones, with capacities ranging from 15 to 100 kgs./hr. In its strategy for industrial development, the National Development Plan has recommended that enterprises producing cooking oil should be encouraged as they produce essential consumer goods. Additional quantities of oil cakes would also then be available to farmers and the stock feed industry.

Prior to the freeing of the economy, edible oil produced in Zambia found its way across the borders to neighbouring countries. The annual production then was estimated to be in the region of 40,000 M.T.

With the elimination of Government subsidies and price control, the prices of edible oil went up steeply and the demand for the product from neighbouring countries disappeared. In fact, the trend of edible oil flow has now reversed, with products from the neighbouring countries producing edible oils moving into the Zambian market. The current domestic demand for edible oil is estimated to be around 25,000 M.T. per annum and the estimated market shares are as under:

Source	Qty (M.T.)	Percent
Premium Oil	10,000	40
ROP	8,000	32
Unified Chemicals	4,000	16
Imports & others	3,000	12
Total	25,000	100

Poor storage facilities and non extension of credit facilities have prevented local farmers from committing their produce to local oil processors. Instead, they have opted for exporting their produce to neighbouring countries, even at less remunerative prices.

* Lack of standardisation is a considerable impediment to the oil processing industry. The Zambia Bureau of Standards has not been very effective in setting standards for product and quality control systems due to lack of laboratory facilities and the absence of trained and experienced technical staff.

PARTICULARS OF CULTIVATED AREA, PRODUCTION AND SALES FOR 1989/90 AND 1990/91 GROWING SEASONS

	Area		Production		Sales	
	1989/90	1990/91	1989/90	1990/91	1989/90	1990/91
	HA		MT		MT	
Maize	763,277	578,815	1,092,670	1,447,793	512,289	630,000**
Sunflower	44,289	36,923	19,965	23,393	18,647	22,925
Sorghum	48,465	44,450	19,591	39,590	1,004	5,515
Millet	58,868	48,520	31,500	31,140	323	321
Ground nuts	80,443	127,290	25,085	44,809	433	20,079
Soya beans	29,814	52,873	26,791	60,865	25,242	54,841
Mixed beans	26,435	52,435	14,318	25,599	428	14,198
Rice	9,533	11,247	10,365	14,039	6,163	9,210
Cotton	64,036	33,116*	30,666	69,152	30,666	69,152
Tobacco (Virginia)	3,588	2,973*	2,900	3,678	2,900	3,678
Tobacco (Burkey)	1,483	1,323*	1,500	1,308	1,500	1,308

* 1990/91 Hectarage figures for cotton, Virginia and Burkey tobacco have been imputed.

** Estimated by EWU, Ministry of Agriculture.

Source: Central Statistical Office (CSO)

2.2 Problems and constraints

Major problems facing the edible oil industries include:

* A critical shortage of managers who possess the requisite industrial experience and training and of technologists and engineers of all disciplines with "hands-on" experience in similar industries.

* Poor quality of domestically produced oil seeds. The oil content is comparatively low compared to international standards. Besides, the supplies to mills contain unacceptable quantities of impurities which damage equipment, especially the expeller screws. This invariably results in poor performance of the equipment, frequent breakdowns and increased need for maintenance.

* Poor infra-structure and lack of basic support industries to provide a reliable source of simple engineering spares. Companies have to depend, at present, almost entirely on imported spare parts and engineering services.

* The prices of maize and wheat have been steadily increasing and farmers are switching over from soya bean and sunflower cultivation to maize and wheat cultivation.

* Soya beans and sunflower are sown in November/December and harvested during the period April/June. The edible oil industry has to procure its entire requirements of these items during this period as the farmers do not have holding power. This puts pressure on the working capital. Inadequate working capital results in delayed payments to farmers, eroding their confidence. Efforts should be made to meet the peak requirement of funds for this purpose with the assistance of financial institutions.

3.0 BACKGROUND OF THE COMPANY

Premium Oil Industries Ltd. is a parastatal (public sector undertaking), wholly owned by INDECO Ltd., which in turn is a subsidiary of ZIMCO.

The Company started its operations in 1964 as Refined Oil Products Ltd., a subsidiary of the Rhodesia Industries, with headquarters in Salisbury (Harare).

In 1975, as a result of the Government's nationalisation policy, Refined Oil Products Ltd. was merged with Lever Brothers Ltd. NDOLA and a new company, ROP (1975) Ltd., was formed.

In July 1986, the two units of ROP (1975) Ltd. at NDOLA and LUSAKA were split, with the Lusaka unit being incorporated as a separate company under the banner of Premium Oil Industries Ltd.

POI is the single largest integrated edible oil processing company in Zambia.

The range of products manufactured by the Company include edible vegetable oil, stock feed (from soya and sunflower seeds), margarine, bakery fats and glycerine. It also produces laundry and toilet soaps.

3.1 Location

The Company's factory and head office are located in the Industrial Area on Mumbwa Road, which is in close proximity to the central business districts of Lusaka.

The approach roads are in extremely poor shape with large potholes and the asphalt surface having totally disappeared.

3.2 Inputs

Presently vegetable oil processing is based on

Imported crude vegetable oil - 60%

Crude oil from soya beans & sunflower seeds - 40%

Soya beans are procured locally through commercial farmers while sunflower seeds are collected from small growers through cooperatives and agents.

Some of the raw materials are imported and the following are their respective quantities and values for the calendar year 1992:

Commodity	Quantity (M.T.)	Value (US$)
Vegetable oil	12,000	5,737,000
Laundry tallow	2,500	1,142,500
Caustic soda	1,269	855,615
Normal hexane	976	825,784
Bleaching earth	15	10,395
Fish fat	120	108,250
	Total	8,679,544

Source: POI - Purchase & Supplies Department

3.3 Outputs

The annual installed capacity is as follows:

a. Refined vegetable cooking oil 15,600 M.T.

b. Laundry soaps 4,500 M.T.

c. Bakery fats - Margarine 730 M.T.
Prembake 650 M.T.

d. Oil seed cakes- Soya cake 72,000 M.T.
Sunflower 108,000 M.T.

The performance for the quarter ended September 30, 1992 is detailed in the table below, along with the budgeted figures:

Product	July - Sept. 92			Cum. Year to Date (Apr.- Sept.92)		
	Actual (M.T)	Budget (M.T)	Actual as % of budget (M.T)	Actual (M.T)	Budget (M.T)	Actual as % of budget (M.T)
Cooking oil	1796	2500	72	3359	5000	67
Soap	849	1125	75	1765	2250	78
Margarine	25	75	33	32	150	21
Bakery Fats	-	75	-	-	150	-
Soyabean cake	2100	4600	46	6632	9200	72
Glycerine	-	25	-	7	50	3

Source: POI - General Manager's report

Raw material stock-out and machinery breakdown are the main causes for low production. During the period under review (July/September 92) the oil mill operated on deep-press for both soya and sunflower seed due to lack of hexane.

Production is affected frequently because of the various causes listed below:

a. <u>Cooking oil</u>

* Stock out of crude oil
* Persistent breakdowns in the new Westfalia refinery.
* Disruptions due to difficulties in the disposal of effluents.

b. <u>Margarine and bakery fats</u>

* Stock outs of hardened fish oil & hydrogenated sunflower oil.

c. Soaps

* Machinery breakdowns, particularly because of vacuum leaks in soap drier chambers and neat soap pump.

d. Oil mill/Solvent extraction plant

* Frequent silo conveyor breakdown
* Lack of spares for expellers
* Low seed intake due to inefficient operation of blower
* Underfeeding of expellers due to low seed intake
* Solvent extraction plant breakdown due to stock out of hexane and breakdown of equipment such as condensers, pumps and steam-lines.

V. DIAGNOSTIC STUDY REPORT

1.0 RAW MATERIALS

1.1 Oil seeds

The plant processes soya beans and sunflower seeds and has adequate storage as well as crushing capacity to process either 200 M.T. of soya beans or 300 M.T. of sunflower, per day.

The Company has prepared a seed procurement plan for the next three years, i.e. 1993/94 to 1995/96, as shown below. This plan is based on the projected sales for cake. The seed purchases will be during the period April/November each year.

	1993/94	1994/95	1995/96
		(Qty. in M.T.)	
Total cake sales projection	25,000	32,000	35,000
70% of which is soya beans	17,500	22,400	24,500
30% of which is sunflower	7,500	9,600	10,500
Projected soya bean cake sales	17,500	22,400	24,500
Process yields 80% cake			
Total whole seed requirement	21,875	28,000	30,625
Rounded off to	22,000	28,000	31,000
Projected sunflower cake sales	7,500	9,600	10,500
Process yields 35% cake			
Total whole seed requirement	21,428	27,428	30,000
Rounded off to	22,000	28,000	30,000

In the past, the Company did not have any arrangements with suppliers, as the cooperatives and agents were involved in purchasing the oil seeds from farmers and supplying them to the Company. This practice has changed now with the advent of a liberalised market environment. The Company now has to make arrangements with suppliers and farmers so as to secure the produce. Small growers have to be educated on the price they should expect for their produce. Agents having infrastructure to handle seeds have to be appointed. They should be allowed only a reasonable profit margin, so that the farmers are ensured fair prices which will, in turn, encourage them to improve their production.

In the past, supply of raw materials was very erratic and of questionable quality. This was because the Company was not actively involved in the procurement programme. Very little seed was procured because of the laxity of the cooperatives and agents. The cooperatives either paid the farmers late or under paid them, which discouraged the farmers from increasing their production. Soya bean cultivation attracted commercial farmers while sunflower cultivation was left to the small land holders. This resulted in lower production of sunflower seeds, preventing the Company from achieving the desired produce mix.

Procurement of seeds is presently being managed by a qualified and experienced agronomist - an expatriate who is on a short-term contract under an Irish Aid programme. His term is due to expire within a year's time.

Serious problems exist in some critical areas which need to be tackled before the Company can hope to come anywhere near achieving the projected sales shown above.

* The quality of seeds need improvement. Excessive contamination of seeds with tramp iron and other harmful extraneous matters should be minimised, if not totally eliminated.

* Non-availability of spares and skilled technicians is a major cause for extended periods of plant down-time, thereby inhibiting production and resulting in low plant capacity utilisation.

* Inadequate arrangements to guarantee payments to farmers have eroded the confidence of the producers. This needs to be remedied along with augmentation of storage facilities at farms.

The management should display will and determination to overcome these problems. It should aim at enhancing the use of indigenous raw materials, i.e. oil seeds and eliminate imported crude oil.

The present trend and the executive thrust within the Company does not inspire any contidence that the level of seed processing will improve to the desired level in the near future.

There is every indication that the practice of importing vegetable crude oil will continue unabated, thus wasting away the scarce foreign exchange resources of the country, besides tying up large sums of working capital for extended periods. Apart from these factors, considerable amount of executive time is spent towards processing imports and subsequent follow-up until the product reaches the factory.

1.2 Imported crude edible oils

ROP Ltd. at Ndola & POI are engaged in similar activities of manufacturing edible vegetable oil, soaps, detergents and toiletries. Both companies refine crude oil, imported via Dar-es-Salaam (Tanzania), from where the product is transported by rail tankers to Lusaka and Ndola. The railways have 62 tankers

- 42 x 34 M.T. - For crude vegetable oil
- 20 x 20 M.T. - For tallow

ROP and POI share the tankers based on the arrival of their respective imports at Dar-es-Salaam. The turnaround of the rail tankers is reported to be slow, due to the inefficient operation by the Tanzania - Zambia Railway (TAZARA).

Discussions at various levels indicate a strong undercurrent of rivalry between the two companies, with attempts to outwit each other in cornering imported arrivals, even though the material may be consigned to the other Company. This is an unfortunate and undesirable state of affairs and therefore the SC has recommended that efforts should be initiated immediately to build good and healthy relations between the two companies, so that both can support and assist each other. For example, when there is a stock-out situation in one company, it is possible that the other is holding excess stocks, permitting it to loan some quantity to the first company, without hampering or effecting its own production schedule. It is understood that in practice this type of cooperative endeavour does not take place. Similarly, one company can assist the other with critical spares during occasions of breakdowns causing a plant shutdown.

Recommendations have been made that both the General Managers should agree to meet at least once a month to discuss and agree on schedules for sharing rail tankers, exchange information regarding shipment programmes, areas of cooperation, etc. The venue of meetings could alternate between Lusaka and Ndola.

Decisions and agreements concluded at the monthly meetings of the General Managers should be followed up and implemented by the respective Purchase Managers, who in turn, should meet every fortnight.

It is only through such meetings that one can build mutual trust and confidence which can result in meaningful cost savings for both companies and contribute towards improved productivity.

The present time is perhaps the most opportune moment to make a beginning in this direction as the Purchasing and Supplies Manager who was with ROP for 15 years has been moved recently (December 92) to POI. With his long association with ROP, this gentleman should have no difficulty in building the right climate for mutual cooperation. Notwithstanding this, it is most essential for the General Managers from both the companies to commence their meetings as expeditiously as possible.

1.3 Other raw materials

Other important items required for the process are :

* Laundry tallow
* Caustic soda
* Normal hexane
* Bleaching earth
* Fish fat

2.0 INFRASTRUCTURE

2.1. Location

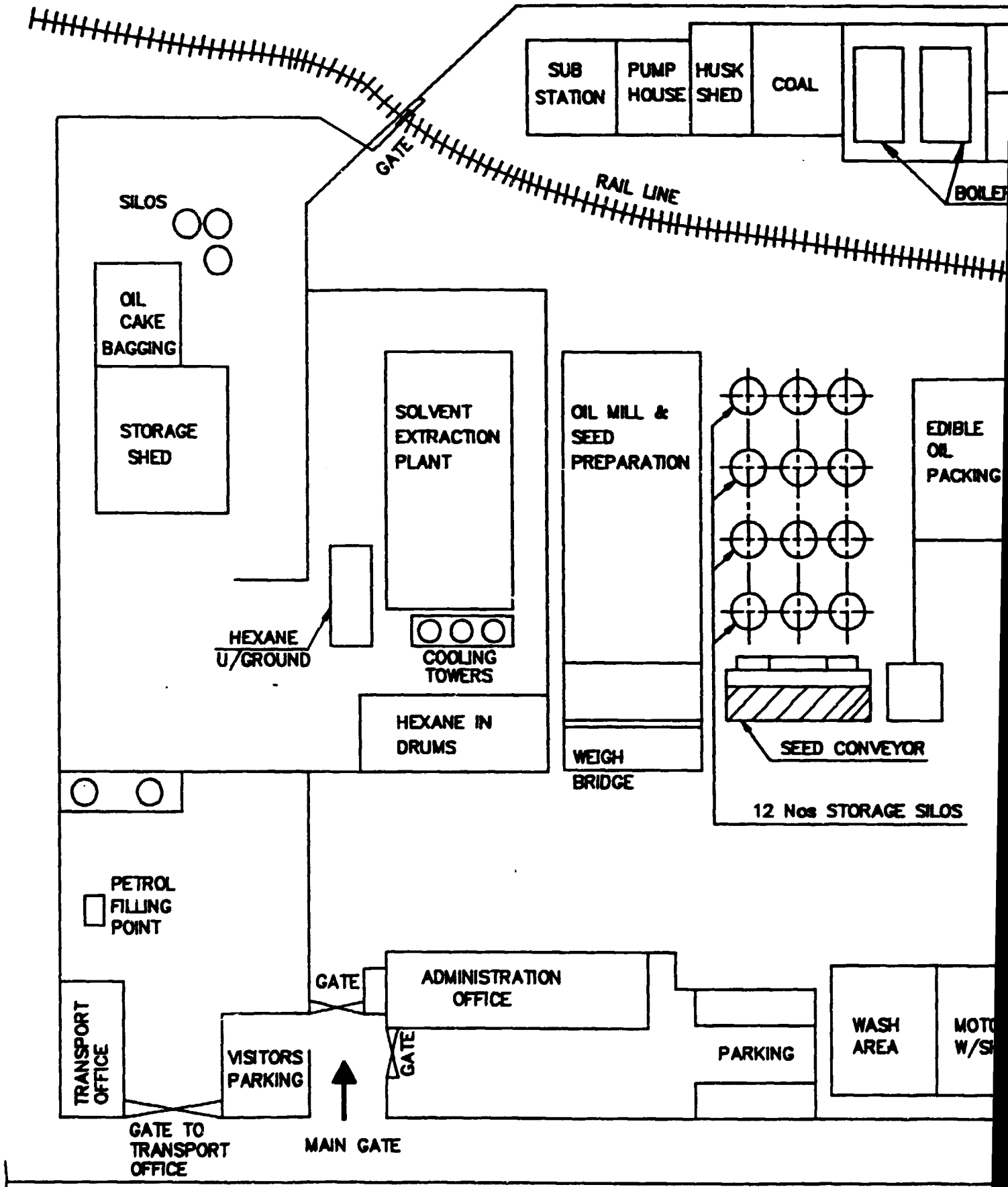
The plant is located in the heavy industrial area on Mumbwa Road, in close proximity (2 KM) to the central business/commercial district of Lusaka. A plant layout drawing is attached over leaf.

2.2. Facilities

a. A three storied office/administrative block is located near the main gate, with a parking lot on one side for visitors and on the other for management staff. The office block is isolated from the main factory with a separate gate and security post, which is manned round-the-clock. The office/administrative building accommodates the General Manager and his immediate supporting staff, the Farm Manager, the departments of marketing, purchase and supplies, finance and accounts, human resources development, conference room and basic toilet facilities.

b. The plant area has 15 silos. 12 silos, with individual capacities ranging between 900 M.T./1200 M.T. are used for storing soya beans/sunflower seeds. Of these, 3 are used exclusively for sunflower seeds. A weigh bridge (100 M.T. capacity) is located nearby to record the incoming quantities of trailer loads. The other 3 silos are located next to the cake pelletising plant and are used for storage of seed cakes.

c. The main factory building incorporates 2 refineries, warehouses, store-rooms, cold rooms, soap section, packaging section, laboratory, company clinic and other ancillary accommodation. The oil mill is housed in a building which has a high head room, pitched roof, concrete block walls and

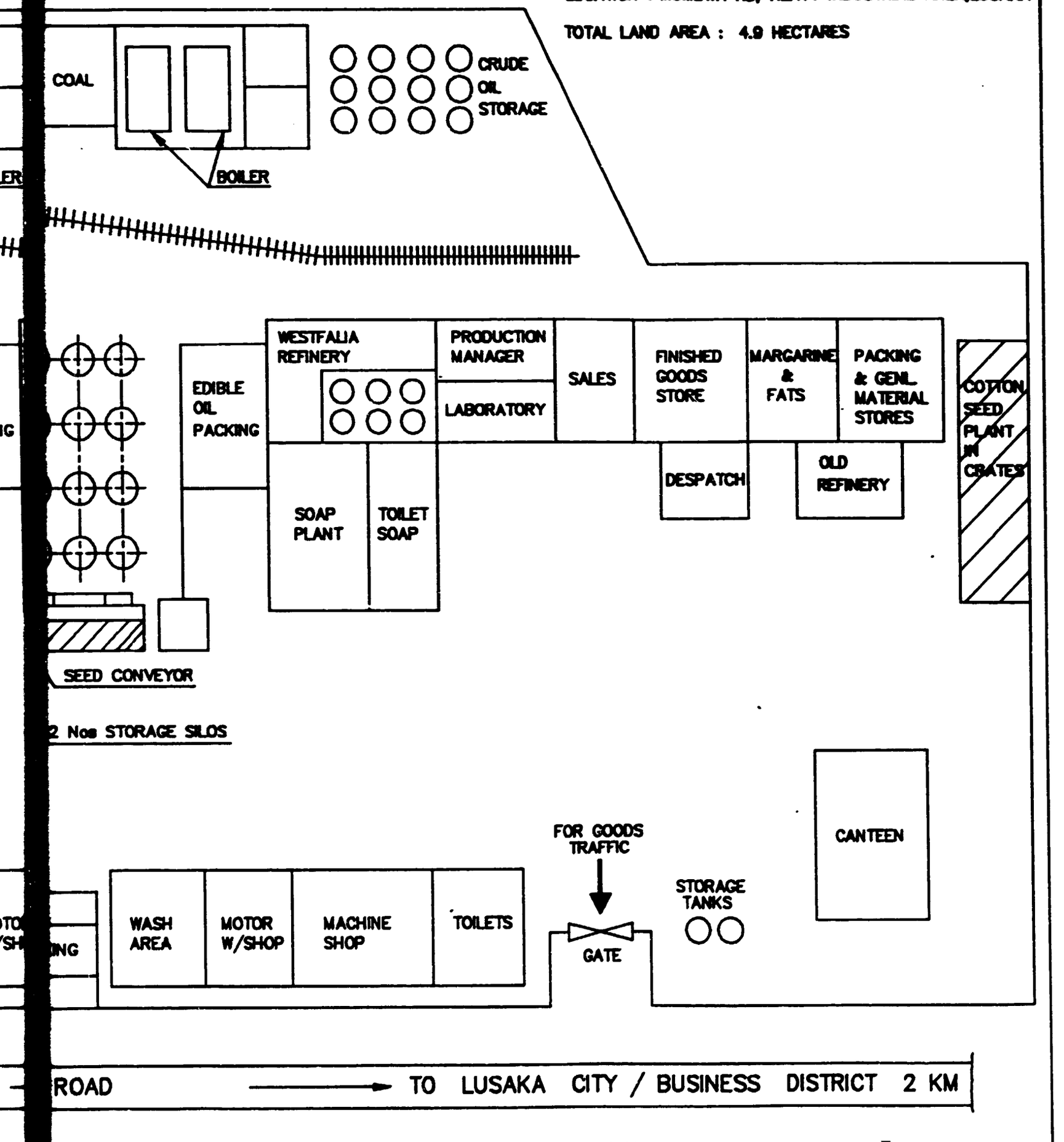


SECTION 1

FACTORY PREMIUM

LOCATION : MUMBWA RD, HEAVY INDUSTRIAL AREA,LUSAKA

TOTAL LAND AREA : 4.9 HECTARES



FACTORY LAYOUT OF PREMIUM OIL INDUSTRIES LTD

SECTION 2

NOT TO SCALE

flooring covering 950 sq. metres of floor area. The Process Manager's office is located within this building.

d. The cake shed is housed in an area of approximately 655 sq. metres and is served by a rail track, complete with loading/off loading platform of approximately 170 sq. metres. The packing room is on 3 levels and is made of steel platforms.

e. The solvent extraction plant is housed under a steel structure with an asbestos roof. Three overhangs are provided to keep off rain water, as the plant is not provided with any walls. The floor is made of reinforced concrete and finished with ceramic tiles. The floor area is approximately 370 sq. metres.

f. The engineering store is housed in a building of approximately 360 sq. metres having brick masonry walls and translucent roofing on tubular steel frames.

The other facilities include:

i. Workshops, engineering project workshops & toilet block
ii. Husk shed
iii. Stationery/security office/change room
iv. Pellet plant
v. Transport sections
vi. Boiler house/fuel - coal shelter
vii. Bore hole, pump house and water recirculation system
viii. Sub-station
ix. Caustic/drum washing bays

3.0 PLANT, PROCESS AND PRODUCTION

3.1 Plant & process

The detailed flow sheet for the various plants/products is given in Annexure - IV.

a. Oil mill and solvent extraction plant:

Oil seeds are received in truckloads, which are weighed on the weigh-bridge and transferred by mechanical conveyors into storage silos. In the silos, temperatures are monitored at various points. Temperature increases are indicative of deterioration setting in. Samples are periodically drawn from various points and examined for presence of insects, mould and general deterioration.

From the storage silos the oil seed is sent for crushing. The existing oil seed processing plant (Buhler) has a capacity to crush either 300 M.T. per day of sunflower seeds or 200 M.T. per day of soya beans. On being drawn from the silos, the seed is first weighed and then screened to separate the grit, dust and fine foreign materials. It is then passed through a destoner to separate stones and then passed over a rotary magnet to remove tramp iron. The efficiency of the cleaning equipment is determined by examining the amount of foreign material before cleaning and after cleaning and the amount of good seed passing together with dirt. POI has fixed a standard that the foreign material must not exceed 2% by weight in the output, but this is not always rigidly enforced.

In the case of sunflower seeds the clean seed is decorticated and the hull separated from kernels is transferred by a cyclone separator to a storage bin and discarded. The amount of hull left with kernels is determined and a maximum of 12% is accepted because too much hull darkens the oil and raises the crude fibre in the subsequent cake. The amount of kernels in the hull is monitored to ensure that the loss is minimised.The kernels with about 8-12 % hull are flaked and steam cooked and heated at 100 degrees Celsius for 30-40 minutes and then screw pressed at about 20 tonnes pressure, to expel the oil. The expelled oil is filtered and stored. The moisture content should be less than 1% so as to minimise the enzymatic activity and consequently minimising the fat splitting.

The subsequent cake is analysed for oil, which must be less than 20%, before it is sent to the solvent extraction plant. In the extractor, the cake is washed for about 70 minutes with hexane to remove the residual oil which goes into a solution called miscella. The spent cake is desolventised, cooled, bagged and sold as stock feed. Sunflower cake protein content should be controlled at 38% minimum, with a fibre content not in excess of 18 % and aflatoxin below 1.25 %, before it is passed for stock feed.

The extracted oil is separated from the miscella by distilling off the hexane. The recovered vegetable oil should contain less than 0.02% of volatile before it is sent for refining.

b. Crude oil analysis

Imported crude oil is analysed for colour, free fatty acids and peroxide value to ascertain rancidity. Qualitative analysis is conducted to determine possible adulteration. For example, the refractive index and iodine value determines the oil quality, chlorine and sulphur detection identifies the solvent residues if the oil was solvent extracted.

During storage, the oil is monitored from time to time by determining its free fatty acid to make sure that there is no fat splitting and peroxide value to see that rancidity is not on the increase.

c. Crude oil refining and quality control

The Westfalia/Krupp oil refinery is designed for a throughput of 100 M.T. per 24 hours of continuous operation.

During refining, the oil is double washed in caustic soda and by a continuous operation, the caustic soda is removed together with the free fatty acids as soap stock. The soap stock also contains water soluble impurities like gums, phosphotides and some pigments.

The soap stock is used for soap making. The neutral oil is then double washed with 10% of hct water to remove traces of soap. The oil is then analysed for free fatty acids which must not exceed 0.1% and for free sodium hydroxide, which must also be very low.

The neutralised oil is then decolorised with 0.5 - 3 % bleaching clay or acid-activated earth. The colour of bleached oil is read on the Lovibond comparator. The colour of oil should be 1-2 red units by international standard. The decolorised oil is then deodorised to remove obnoxious substances at 200 - 220 degrees Celsius under a vacuum of 55 - 60 cm. Hg. The oil is then filtered, cooled and stored in a tank, ready for packing.

As a final quality check, the following analyses are made on the finished product:-

i. The free fatty acid must be less than 0.1%

ii. The colour must be 1.7 red units for sunflower oil and less than 3 red units for soya bean and groundnut oil and 7.6 red units for cotton seed oil on the Lovibond tintometer.

iii. The peroxide value, which indicates the onset of rancidity, should be below 4 mix equivalents.

iv. The taste of cooking oil should be bland or tasteless or neutral.

Finally, while being packed in various containers the oil is examined for presence of foreign materials arising either along the production line or from using dirty packing material.

3.2 Standards and quality assurance

Lack of standardisation of edible vegetable oil products has been a considerable impediment to attaining the desirable international quality of the finished product in Zambia.

The Zambia Bureau of Standards (ZABS), which has the responsibility to promote standards in industry and make manufacturers and users aware of its importance, neither has the infrastructure nor the technically qualified manpower required to effectively perform these functions.

Premium Oil has a well equipped laboratory which is headed by a qualified Quality Assurance Manager, supported by qualified staff. Although the Quality Assurance reports indicate deficiencies, the processing departments have not been able to make significant and consistent improvements. Studies made by the SC showed that the process department had little responsibility in controlling the deficiencies because of the several engineering problems in the plant which have not been permanently resolved.

A typical report issued by the Quality Assurance Department is reproduced below:

QUALITY ASSURANCE REPORT FOR THE MONTH OF NOVEMBER 1992

A. SEED CRUSHED - SOYABEAN SEED

		Results	Specification
Oil content	=	17.8 %	18 - 22 %
Moisture	=	8.7 %	6 - 10 %

The seed being crushed was of good quality.

B. SPENT CAKE

During the month under review, the cake was being solvent extracted. The following results were obtained:

		Results	Specification
Oil content	=	3.50 %	1 % max.
Moisture	=	9.20 %	10 - 12 %
Urease activity	=	0.15	0.3 max.
Protein	=	45.03 %	45 % min.

Residual oil in the spent cake was high due to fluctuations in the feeding of Hexane.

C. CRUDE OIL

		Results
Free fatty acid	=	0.50 %
Moisture	=	0.32 %

D. NEUTRAL OIL

		Results	Specification
Free fatty acid	=	0.05 %	0.05 % max.
Moisture	=	0.18 %	0.20 % max.
Soap	=	42.40 %	50.00 %

E. BLEACHED OIL

Free fatty acid	=	0.06 %	0.08 %
Moisture	=	0.11 %	0.10 %
Colour	=	3.5R 30Y	2R 20Y

The colour of the oil produced was very dark. This was because the bleaching earth was not being properly filtered as the filter cloth was torn and no replacement was available in the stores.

F. DEODORISED OIL

		Results	Specification
Free fatty acid	=	0.07 %	0.1 % max
Moisture	=	0.09 %	0.1 % max
Colour	=	3.2R 30Y	1.5R 10Y

The colour of the finished oil was very dark as a result of the problem at the bleaching plant.

G. EFFLUENT

Total fatty matter	=	2.85 %	3.0 % max

H. MARGARINE

Salt	=	1.7 %	1.7 - 2.0 %
Total fatty matter	=	82.0 %	80 - 83 %
Moisture	=	16.2 %	16 - 16.4 %

Results were within specification.

I. BAKERY FAT

Free fatty acid	=	0.08 %	0.1 %
Moisture	=	0.10 %	0.1 %
Rise point	=	36.5 degrees C	35-36 degrees C

Results were within specification.

J. SOAPS

CHIK

Caustic	=	0.055 %	0.05 %
Salt	=	0.48 %	0.35-0.55 %
TFM	=	66.50 %	65 - 66 %

The results were okay.

SAMBA: The soap has been left to dry as there is a problem of colour bleeding.

4.0 MARKETING

4.1. Industry background

Prior to the freeing of the economy, when government subsidised most of the essential commodities, especially food products, edible vegetable oil prices were government controlled. The cheap availability of edible oil in Zambia caused an artificially inflated demand, estimated to be around 40,000 M.T. per annum. This demand was the result of a substantial quantity (approx. 15,000 M.T. per annum) finding its way, unofficially, across the borders, to the neighbouring countries (mainly Angola and Zaire).

The removal of subsidies and price controls resulted in steep increases in the price of edible oils, which effectively stemmed the flow of goods across the border and in fact the trend of movement has now been reversed. The current domestic demand for edible vegetable oil is estimated at approximately 25,000 M.T. per annum and the market share is as under:

Source	Qty (M.T.)	Percent
Premium Oil	10,000	40
ROP	8,000	32
Unified Chemicals	4,000	16
Imports & others	3,000	12
Total	25,000	100

POI continues to extend credit, in spite of tight cash flow and adverse working capital position. The SC has pointed out to the Company that in view of the prevailing high rate of inflation and the bank interest rates, which were around 75%, granting of any credit whatsoever was totally unjustified. As a policy, credit sales should be stopped forthwith.

4.2 Market penetration

Ccoking oil and soaps are the major contributors to the sales and are marketed throughout the country through a network of distributors appointed to cover Lusaka, Central, Eastern, Southern and Western Zambia.

Cooking oil is packed in plastic jerry cans of 2.5 litre capacity, 600 ml. bottles and 200 litre steel barrels. The product is branded as "PREMIUM OIL". Although the product quality is generally considered to be equal or better than that of other competitors, it does not compare favourably with imported products from Zimbabwe and South Africa.

In the marketing of soaps POI's 'CHIK' is comparable to products from local competitors - 'DAMBO' from ROP and 'SOLO' from Unified Chemicals. The wrapping and printing are generally shoddy and do not compare well with imported products. The SC has made recommendations to improve the packaging through the use of silk-screen printed cans and bottles, and to avoid use of badly printed labels which are also not affixed properly on the containers.

4.3. Product mix

The product-mix for 1992-93 has been planned as under:

PRODUCT	BUDGET			
	Qty (M.T.)	%	Value (K'000)	%
A. Cooking Oil				
i. 200 litre	2400	24	789,864	14.0
ii. 2.5 litre	4989.6	50	1,904,388	33.8
iii. 600 ml.	2570.4	26	800,246	14.2
Sub total	9960	100	3,494,498	62.0
B. Soaps				
i. Chik 500 gms	2684	60	767,472	13.6
ii. Chik 135 gms	1056	24	306,984	5.5
iii. Sambo	720	16	151,553	2.7
Sub-total	4460	100	1,226,009	21.8
C. Seed cakes				
i. Sunflower	7605	45	131,988	2.3
ii. Soya	9295	55	583,012	10.4
Sub-total	16,900	100	715,000	12.7
D. Fats				
i. Prembake	300	50	78,696	1.4
ii. Premargarine	300	50	104,263	1.8
Sub-total	600	100	182,959	3.2
E. Others	100		16,800	0.3
Grand total	32,020	100	5,635,266	100.0

4.4 Promotion

The advertising and promotional expenses are budgeted by the Company at approximately 3 % of the annual turnover.

Sales operations are mostly through wholesalers/distributors throughout the country, who arrange re-distribution to the retail outlets.

Advertising is done mainly through newspapers and magazines, hoardings and radio jingles.

The SC has recommended the following measures as part of the promotional effort -

i. POI's distributors currently enjoy a sliding scale of discounts, related to volume of off take. A further incentive for better performance can be considered, by offering an end of the year prize for the distributor whose performance is outstanding by recording the highest sales, within the framework of the Company's policies. The prize could be both monetary as well as in kind, and should be organised in a manner that it receives wide publicity, supported by good image building, whereby the recipient should consider his/her selection as a prestige.

ii. POI's products could also be promoted through competitions like cooking competitions, competitions for the best recipe, etc.

iii. Some promotional efforts could be jointly organised in cooperation with manufacturers of products which have a synergy with cooking oil like manufacturers of aluminium kitchenware. A company like Zambia Aluminium Ltd. in Lusaka could be associated in this type of promotional campaign.

5.0 FINANCE

5.1 Interpretation of ratios

The following interpretations have been given based on the analysis of annual accounts presented in the following pages.

1. Raw material cost to Cost of sales (COS) is dropping, but due to increase in interest cost, COS/sales remains the same.

2. Current ratio of less than '1' indicates difficult financial situation further substantiated by the very low and falling liquidity ratio of 0.22.

3. Sales volumes have remained more or less the same. Increase in costs have been compensated by price increases.

4. Turnover to Fixed Assets (FA) ratio is showing an increasing trend. Higher the ratio better is the use to which fixed assets are put. However, FA is an historical cost, turnover is on present cost basis and hence not indicative in an inflationary situation.

5. Working Capital (WC)- Turnover ratio indicates the number of times a unit invested in WC produces sales. Higher the ratio better the WC utilisation. In 1990-91 and 1991-92, the Company had negative WC.

6. Capital turnover also like FA turnover does not indicate anything unless fixed assets are adjusted for inflation.

7. Raw material (RM) turnover ratio is indicating an increasing trend in the RM holding. Against - 1.7 and 3.1 months in 1989-90 and 1990-91, it has increased to 5.5 months in 1991-92 .

8. Contrarily, the stock turnover ratio indicates the turnover of finished goods and hence higher the ratios better is the stock utilisation. However, this ratio has fallen dramatically from 604 in 1988-89 to 10.7 in 1991-92.

9. The fixed assets to net worth ratio which shows the funding pattern of a company has shown a substantial increasing trend indicating high short term funds utilisation.

10. The ratio of long term funds to net fixed assets shows a ratio of less than 1. It may be the right short term financial situation. However, in POI it is due to diversion of short term funds for capital expenditure.

ANALYSIS OF PROFIT & LOSS ACCOUNT

	ACTUALS YEARS				K'000S
	1988-89	1989-90 (AS RESTATED)	1990-91	1991-92	1992-93 UPTO SEPT 1992
Turnover	1,79,035	4,31,914	8,27,727	15,19,173	16,01,109
Cost of production:					
Raw material cost	1,25,675	2,89,391	5,71,384	9,21,702	10,45,431
Salaries & wages	4,584	10,313	25,245	64,938	80,528
Depreciation	3,984	5,542	6,727	8,622	17,719
Other expenses (Less other income)	13,982	30,686	72,143	1,53,903	1,21,528
	1,48,225	3,35,932	6,75,499	11,49,165	12,65,206
Gross profit	30,810	95,982	1,52,228	3,70,008	3,35,903
Administrative exps.:					
Salaries & wages	5,138	11,155	21,472	48,372	
Depreciation	194	2,015	2,197	4,357	
Other expenses (Less other revenue)	7,565	27,415	43,888	71,028	
	12,897	40,585	67,557	1,23,757	1,57,460
Selling & dist. exps.:					
Salaries & wages	1,020	2,223	2,595	5,115	
Depreciation	1,142	443	931	1,857	
Other expenses	3,306	3,530	2,743	4,205	
	5,468	6,196	6,269	11,177	20,405
Profit before interest & tax (PBIT)	12,445	49,201	78,402	2,35,074	1,58,038
Financial charges	11,286	24,255	60,450	2,17,151	1,14,510
Profit before tax (PBT)	1,159	24,946	17,952	17,923	43,528
Exceptional item	-	-	7,581	-	-
	1,159	24,946	10,371	17,923	43,528
Sales	1,79,035	4,31,914	8,27,727	15,19,173	16,01,109
Less: PBT	1,159	24,946	17,952	17,923	43,528
Cost of sales	1,77,876	4,06,968	8,09,775	15,01,250	15,57,581
Less interest	11,286	24,255	60,450	2,17,151	1,14,510
	1,66,590	3,82,713	7,49,325	12,84,099	14,43,071

ANALYSIS OF BALANCE SHEET

	ACTUALS YEARS				K'000S
	1988-89	1989-90 (AS RESTATED)	1990-91	1991-92	1992-93 UPTO 30.9.1992
I. NET FIXED ASSETS	57,361	57,855	1,07,580	1,34,998	6,73,440
A. CURRENT ASSETS:					
Stock	1,05,453	1,87,529	2,43,332	7,60,681	7,69,539
Sundry debtors	4,021	18,516	75,037	26,793	1,05,182
Other debtors	20,369	59,109	1,13,058	1,99,136	1,30,477
Cash & bank	4,273	18	96	1,022	27,878
	1,34,116	2,65,172	4,31,523	9,87,632	10,33,076
B. CURRENT LIABILITIES:					
Bank overdraft	82,647	1,17,441	1,35,382	3,40,473	2,15,323
Short term debts	21,587		60,000	1,74,456	39,000
Sundry creditors	13,463	22,978	27,757	62,798	57,133
Other creditors	14,407	1,00,216	2,22,707	4,25,281	6,96,372
Taxation	375	2,730	825	6,495	17,880
Dividend payable		5,675	4,773	4,600	4,600
	1,32,479	2,49,040	4,51,444	10,14,103	10,30,308
II. Working capital (A-B)	1,637	16,132	-19,921	-26,471	2,768
Capital employed (I + II)	58,998	73,987	87,659	1,08,527	6,76,208
Net worth	56,732	69,610	74,383	79,037	6,16,208

RATIO ANALYSIS

	1988-89	1989-90 (AS RESTATED)	1990-91	1991-92	1992-93 ACTUAL 30.9.1992
Current ratio	1.01	1.06	0.96	0.97	1.00
Liquidity ratio	0.22	0.31	0.42	0.22	0.26
Cost of Sales/Sales(%)	99.35	94.22	97.83	98.82	97.28
Material Cost/Sales(%)	70.20	67.00	69.03	60.67	65.29
Salary/Sales(%)	6.00	5.49	5.96	7.80	5.03
Other Expenses/Sales(%)	13.88	14.27	14.35	15.08	7.59
Interest/Sales(%)	6.30	5.62	7.30	14.29	7.15
PBIT/Sales(%)	6.95	11.39	9.47	15.47	9.87
Fixed Asset Turnover ratio	2.90	6.62	6.97	9.51	2.14
Working Capital Turnover ratio	101.77	23.72	-37.61	-48.51	521.34
Capital Turnover ratio	2.82	5.17	8.55	11.83	2.13
Raw Material Turnover ratio	3.34	1.73	3.11	5.54	
Stock Turnover ratio	603.59	443.47	143.19	10.65	
Fixed assets/Net worth	1.01	0.83	1.45	1.71	1.09

6.0 HUMAN RESOURCES

6.1 Present organisation structure

The Company is a wholly owned subsidiary of INDECO Ltd., which in turn is a wholly owned subsidiary of Zambia Industrial and Mining Corporation Ltd. (ZIMCO). The organisation operates on the policy guidelines drawn up by the Board of Directors who are essentially nominees of INDECO Ltd.

The terms and conditions of all employees are also accordingly governed by the broad framework of service conditions laid down by ZIMCO Ltd., including the salary structure and other benefits accorded to various levels of employees.

The organisation structure consists of seven departments -

* Production
* Quality assurance
* Finance & accounts
* Purchasing & supplies
* Engineering
* Marketing
* Human resources

Each of the departments are headed by a Manager who reports to the General Manager. The present General Manager has been with POI for less than a year and prior to this appointment he was the General Manager of Kapiri Glass Products Ltd.

The organisation charts of the Company and the respective departments are shown in Tables: 1 to 8 . The total employment level as on 30.11.92 stood at 460. The manpower categorisation is shown in Table 9.

The background of senior management staff is summarised in Table 10.

TABLE 1 ORGANISATION CHART

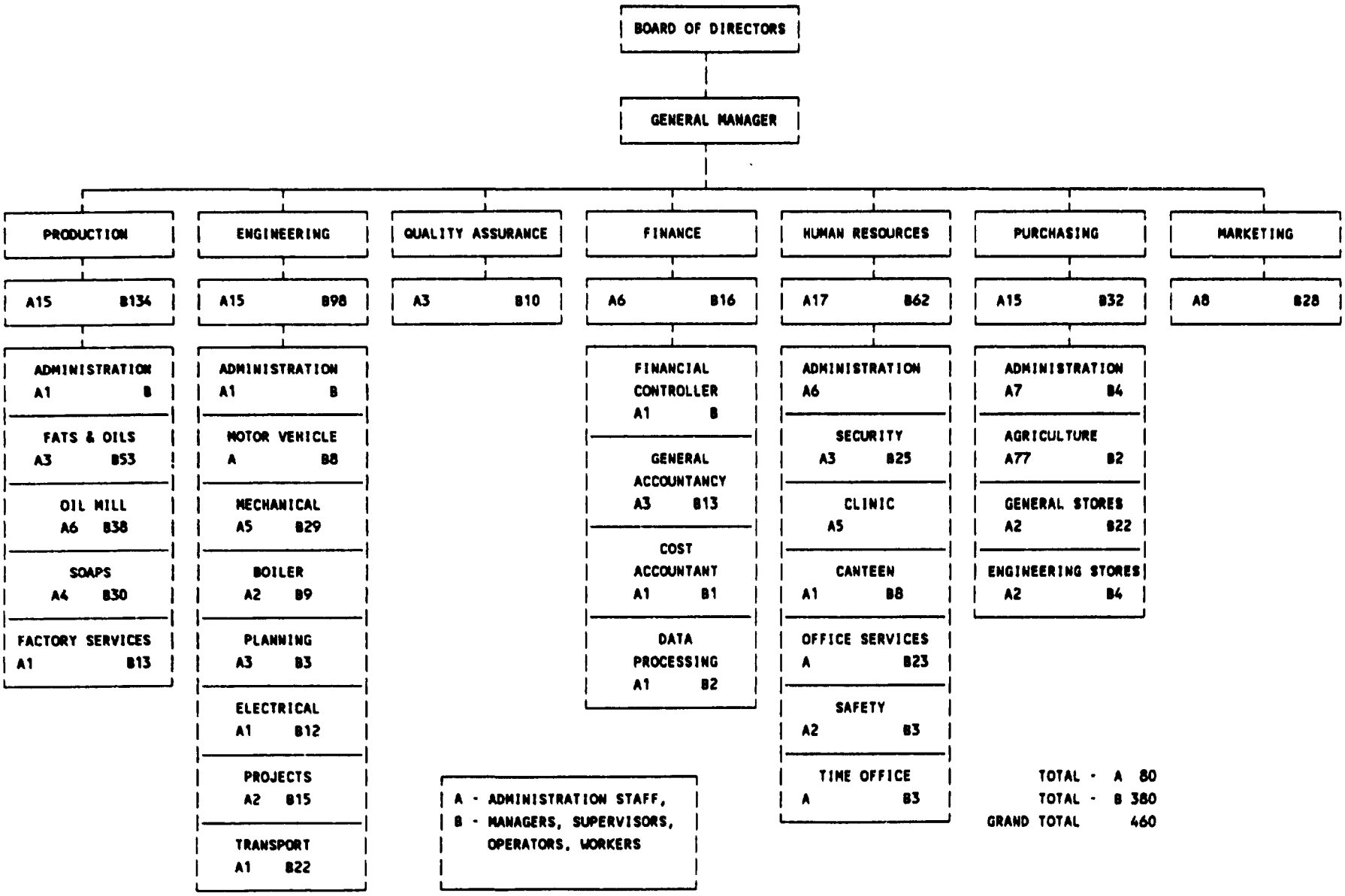


TABLE 2 ORGANISATION CHART

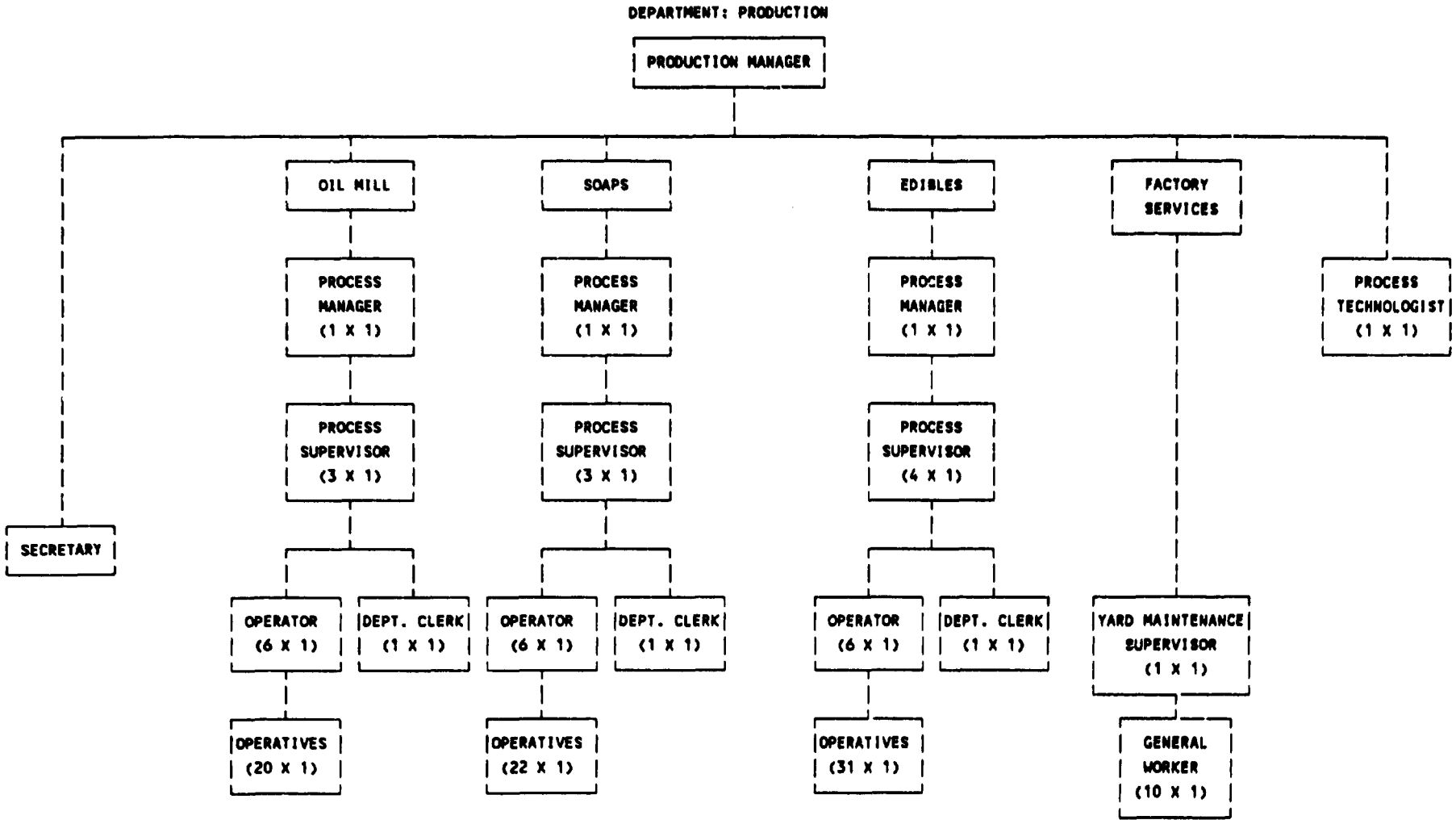


TABLE 3 ORGANISATION CHART

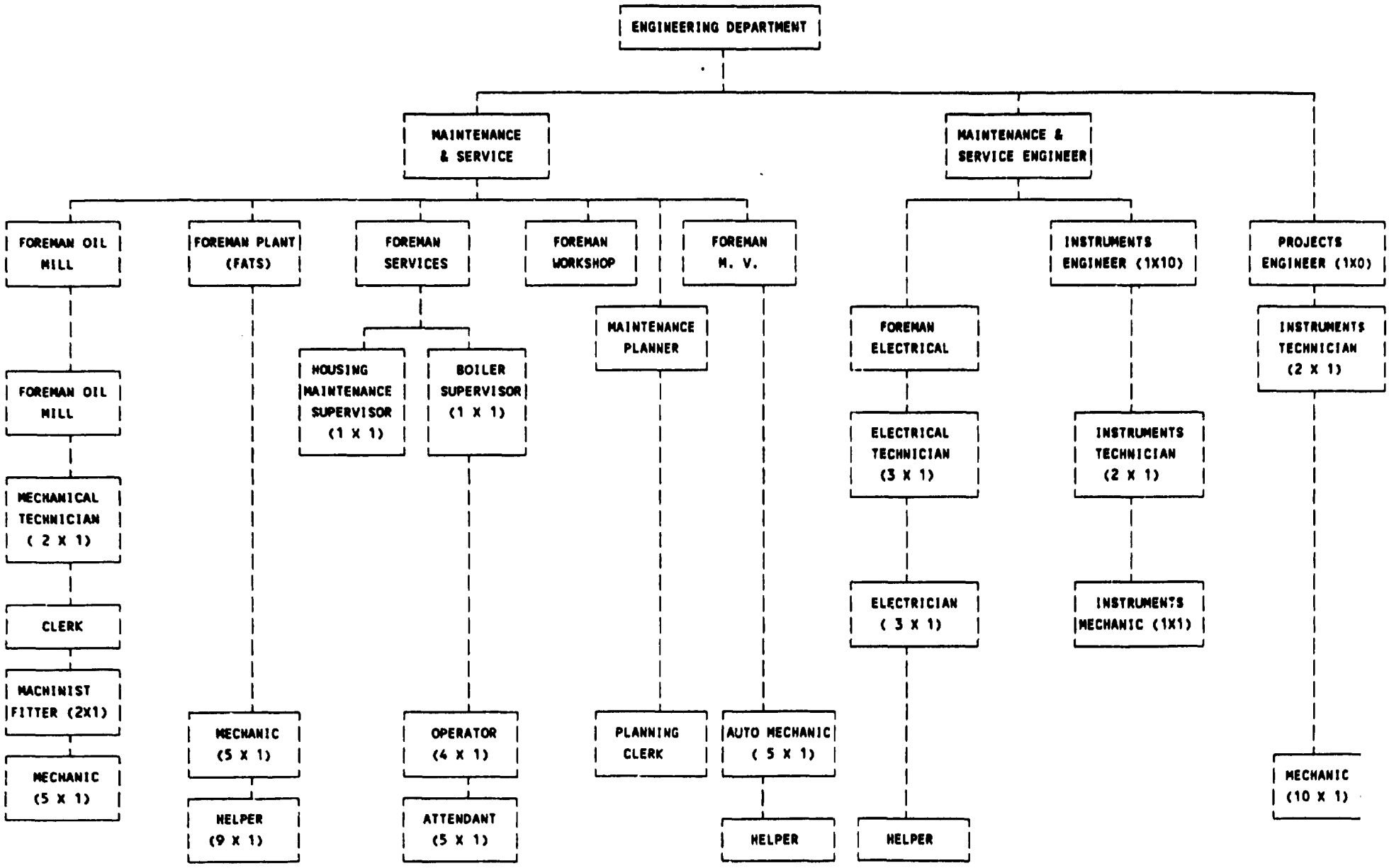


TABLE 4 ORGANISATION CHART

QUALITY ASSURANCE

QUALITY ASSURANCE MANAGER

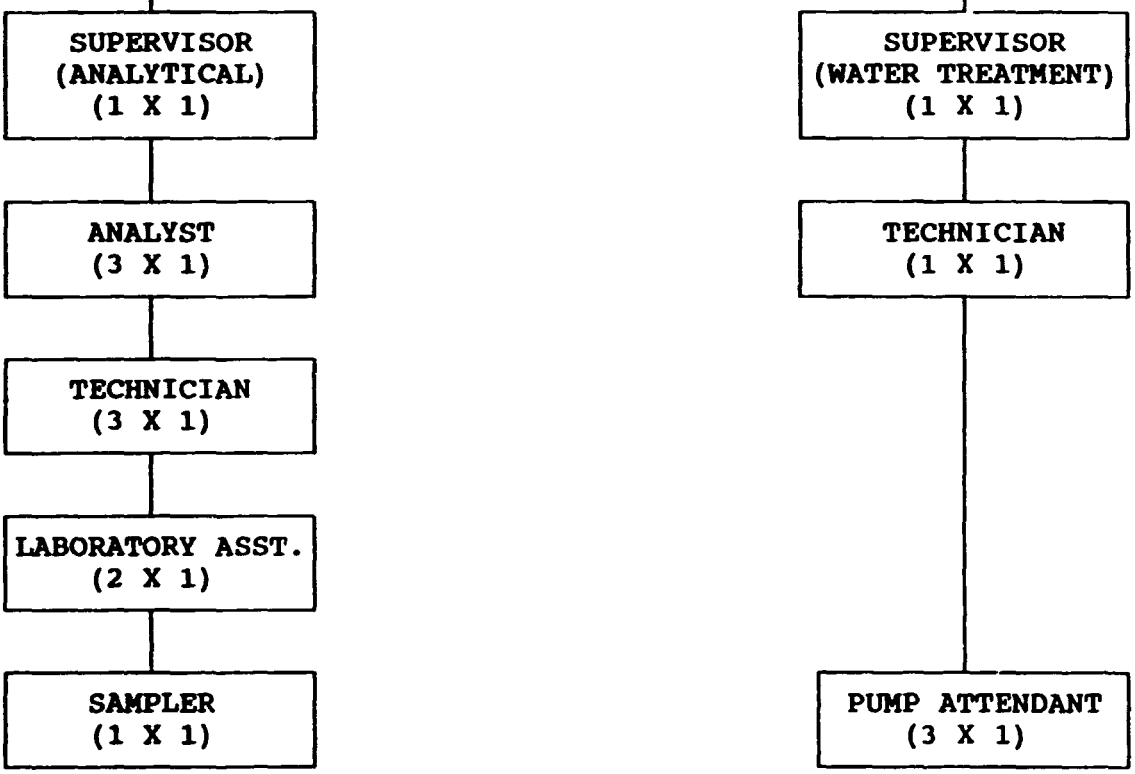


TABLE 5 ORGANISATION CHART

DEPARTMENT: MARKETING

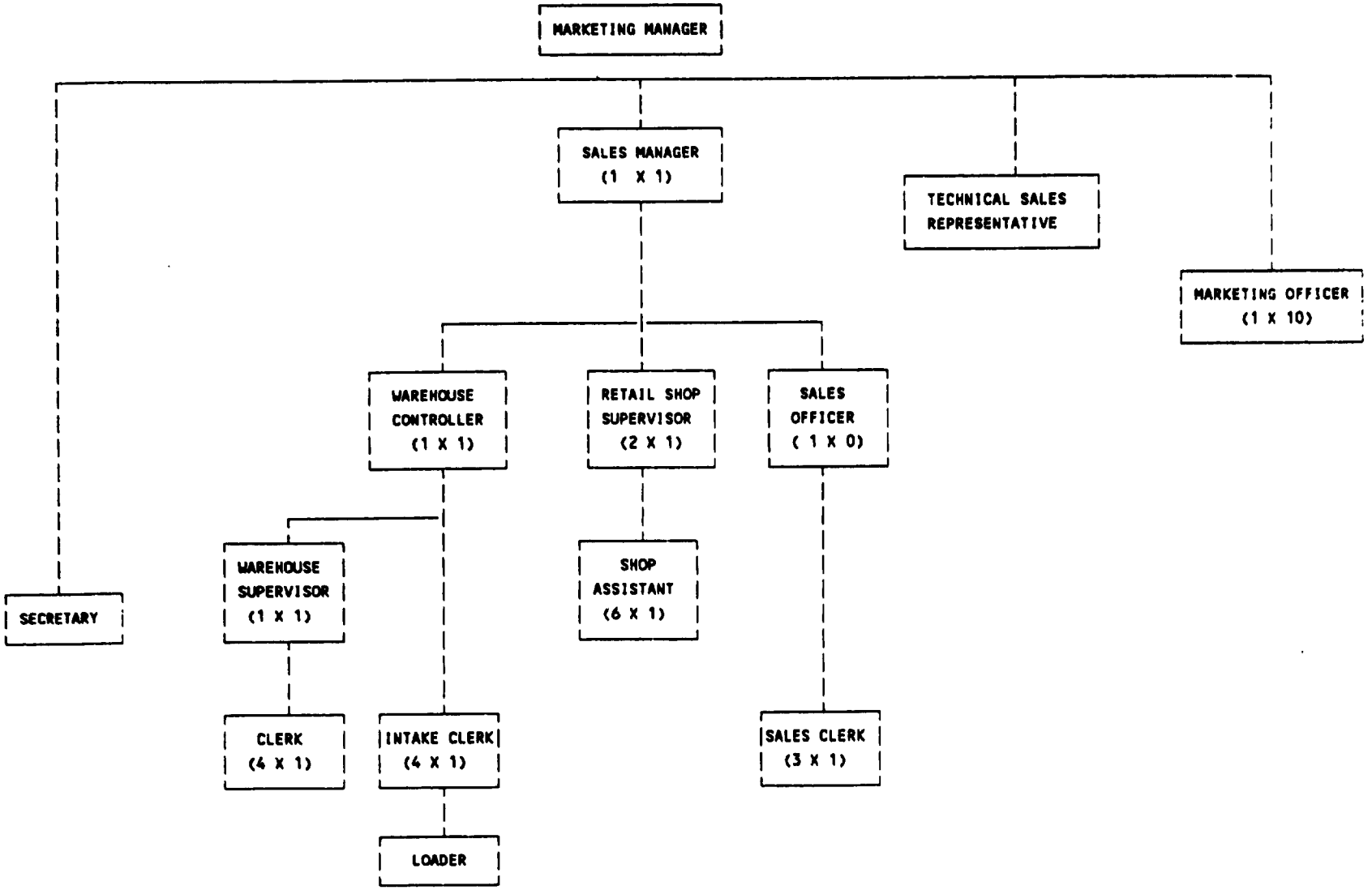


TABLE 6 ORGANISATION CHART

DEPARTMENT - FINANCE & COSTING

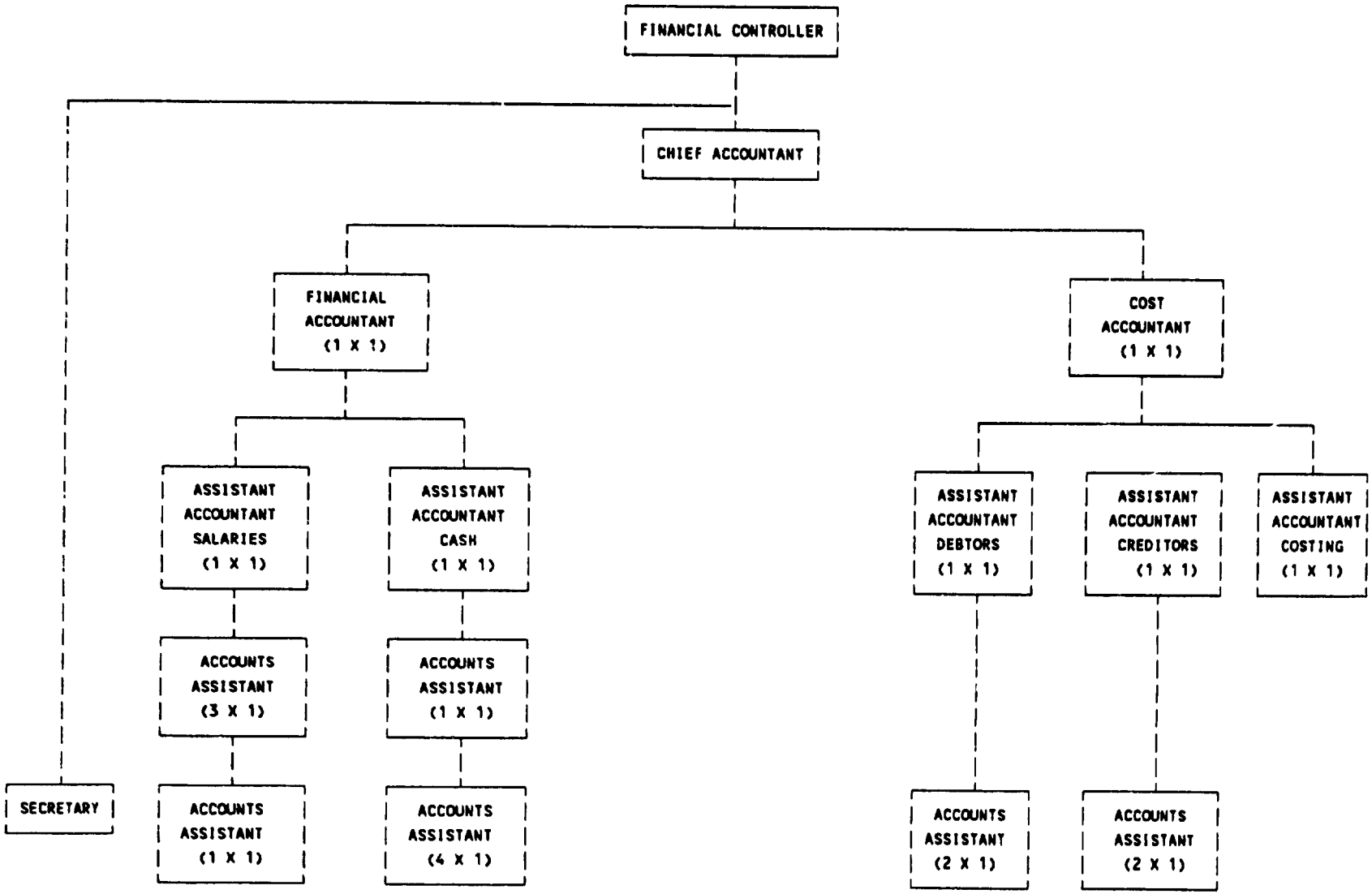


TABLE 7 ORGANISATION CHART

DEPARTMENT - HUMAN RESOURCES

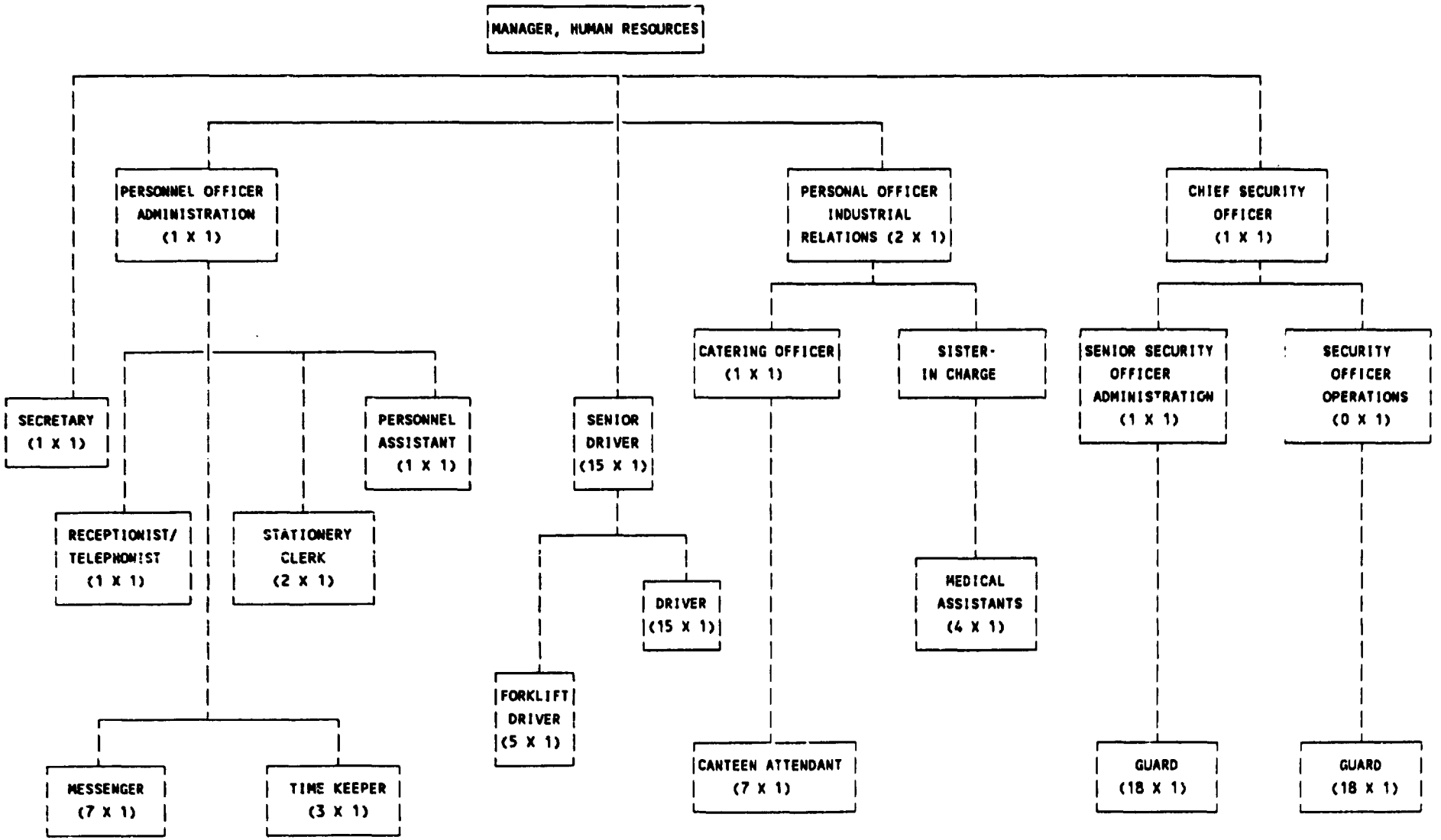


TABLE 8 ORGANISATION CHART

DEPARTMENT - AGRICULTURE & SEED PROCUREMENT

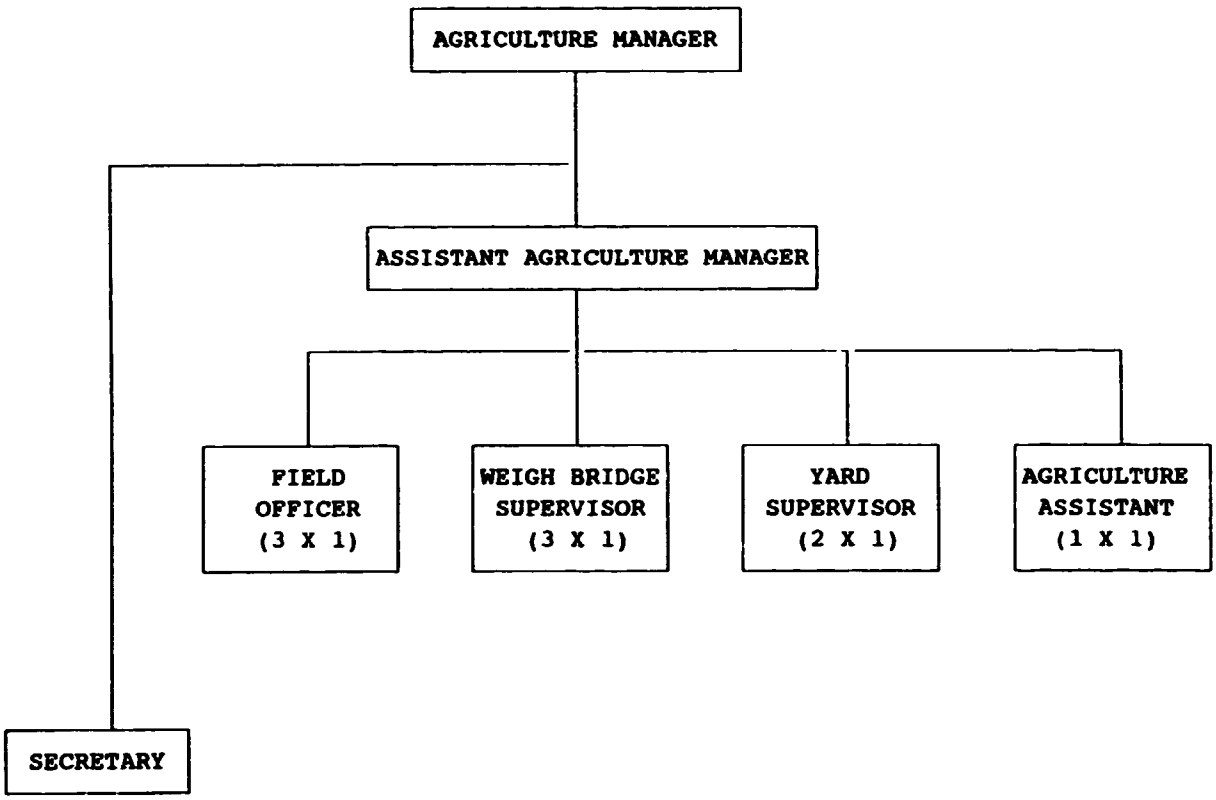


TABLE 9 MANPOWER CATEGORISATION AS AT 30.11.92

CATEGORY	NUMBER	%
SENIOR MANAGEMENT	11	2.4
MIDDLE MANAGEMENT	16	3.5
SUPERVISORY	18	3.9
TECHNICAL	110	23.9
CLERICAL	35	7.6
GENERAL	270	58.7
TOTAL	460	100

TABLE 10 CV'S OF SENIOR MANAGEMENT STAFF

Mr. P.C. JAIN Age: 52 years	B.COM., L.L.B., M.B.A. FINANCE MANAGER - POI FINANCE MANAGER - ZSBS LTD., JULY 1988/FEB 1992 CHIEF ACCOUNTANT - AFE, 1983 CHIEF ACCOUNTANT - ZAMBIA PORK PRODUCTS, 1982 CHIEF ACCOUNTANT - AFC, 1981 CHIEF ACCOUNTANT - RDC, ZAMBIA, 1981 ACCOUNTS OFFICER BHARAT HEAVY ELECTRICALS LTD. BHOPAL, INDIA, 1964-1972 ASST. CONTROLLER OF FINANCE, BHARAT ELECTRONICS GHAZIABAD, INDIA, 1972-1981
Mr. E.C. PHIRI Age: 36 years	B. SC. DEGREE - CHEMISTRY QUALITY ASSURANCE MANAGER - PREMIUM OIL INDS. 1991 TO-DATE LABORATORY TECHNICIAN - 1980
Mr. R. KATOWA Age: 32 years	BACHELOR OF ARTS WITH LIBRARY STUDIES PLUS CERTIFICATE IN MARKETING MARKETING MANAGER - PREMIUM OIL INDUSTRIES 1991 TO-DATE SALES MANAGER - NCZ, 1990 MARKETING LIAISON OFFICER - NCZ MANAGEMENT TRAINEE - NCZ, 1984-1986
Mr. A.M. MALUMO Age: 31 years	BACHELOR OF SCIENCE DEGREE, MATHEMATICS STATISTIC COMPUTER APPLICATION DATA PROCESSING MANAGER - PREMIUM OIL INDS. 1992 TO-DATE PROGRAMMER - CONTRACT HAULAGE, 1986-1987 COMPUTER CONSULTANT - KAFUE TEXTILES, 1987-1991 DATA PROCESSING MANAGER - STAR COMMERCIAL 1991-1992
Mr. L.K. MWILA Age: 38 years	SECRETARIES CERTIFICATE 90-55 WPM, SECRETARIES CERTIFICATE 100-65WPM, CERTIFICATE IN PERSONNEL MANAGEMENT MANAGER - HUMAN RESOURCES - PREMIUM OIL INDS. 1988 TO-DATE SENIOR PERSONNEL OFFICER - PREMIUM OIL INDS. DECEMBER, 1987 PERSONNEL OFFICER - INDECO LTD, 1982-1987 PERSONNEL SECRETARY - INDECO LTD, 1974-1982

Mr. A. SIMFUKWE Age: 33 years	BACHELOR OF SCIENCE MECHANICAL ENGINEERING ACT. ENGINEERING MANAGER - PREMIUM OIL INDS. 1992 TO-DATE MAINTENANCE AND SERVICES ENGINEER 1991 - PREMIUM OIL INDS. 1991 WORKSHOP MANAGER - KUDU ENGINEERING 1991 SENIOR ENGINEER PLANNER - SCHEDULE ZCCM 1988-90
Mr. S.G. MTAMIRA Age: 32 years	ACCA CHIEF ACCOUNTANT - PREMIUM OIL INDS. LTD SINCE NOVEMBER 1991 TO-DATE WORKS ACCOUNTANT, PREMIUM OIL INDS. LTD SINCE NOVEMBER 1990-91 ASSISTANT ACCOUNTANT, INDECO 1985-90
Mr. R.M. MULENGA Age: 31 years	ACCA MANAGEMENT ACCOUNTANT - PREMIUM OIL INDS. - JUNE 1991 ACCOUNTANT - MINISTRY OF COMMERCE AND INDUSTRIES 1988-1992 SR. ASSISTANT ACCOUNTANT - TRAINEE METAL FABRICATION OF ZAMBIA, 1985-88
Mr. T.R. KAWALA Age: 45 years	CITY AND GUILD CERTIFICATE, LAB. SCIENCE IN PLANT COURSE PRODUCTION MANAGER - PREMIUM OIL INDS. LTD. PLANT MANAGER - ROP 1979 PLANT MANAGER - PREMIUM OIL INDS. LTD. SINCE 1990 PLANT SUPERINTENDENT - ROP 1973 LAB. TECHNICIAN - ROP, 1973

From an analysis of manpower distribution, it would seem that -

* There is excessive manpower in the departments of Human Resources and Purchasing, both at Administrative and Operative levels. It should be possible to reduce the strength at both these levels by restructuring the work distribution and better training of the staff.

* The quality and skills of manpower in both production and engineering departments are below standard. The Engineering Department, in particular, is very weak. It is headed by an Acting Engineering Manager who has only about two years of actual shop floor engineering experience and another two years in the Planning department with a total work experience of 4 years, which is considered to be grossly inadequate for a manufacturing set up of POI's size and complexity.

6.2. Stores organisation

The raw materials and engineering stores fall under the direct administrative control of the Purchasing and Supplies department while the finished goods stores falls under the administrative control of the Marketing Department. This arrangement is not desirable and is not conducive to strict internal controls.

It has been recommended that all the stores, viz. raw materials, engineering and finished goods stores should be placed under the independent charge of a Materials/Stores Manager reporting directly to the General Manager. The Stores Manager would thereby exercise controls on incoming supplies both in terms of quality and quantity and similarly verify and control receipts of finished goods from the Production department and issues of

finished goods to the Marketing department. The level of integrity of a high percentage of operating personnel in manufacturing and business organisations is suspect and hence the need for incorporating self-correcting systems, particularly in areas such as materials control.

6.3 Welfare and training

The Company has fairly good canteen facilities. Employees are provided with subsidised meals.

A clinic is run on the premises with a qualified nurse. It treats employees who sustain injuries while on duty and dispenses drugs for routine illnesses, while serious cases are referred to the University teaching hospital.

The Company provides free transport to its employees and extends assistance at funerals and other emergencies.

Employees are occasionally sent for training programmes organised by outside agencies. However, the Company does not have either a structured training scheme covering all levels or any in-house training facilities. It has been recommended that a full-time in-house training school should be set-up in the Company's premises, under the direct responsibility of a well qualified and experienced Training Manager.

The Training School should concentrate on imparting training to middle management and employees at all lower levels, covering especially the weak areas of production and engineering, through a tailor-made programme and syllabus designed to meet PCI's specific requirements.

Although there are no serious industrial relations problems the general morale of the Company's employees appeared to be low, more especially in the ranks of the middle management. This would appear to be partly because of the lack of continuity in leadership - the present General Manager has been in the Company for less than a year and during the past three years, three different General Managers have held that position, leading to frequent changes in Management policies and operating styles.

The communications between various levels appeared to be poor, leading to suspicion and mistrust. It has been recommended that informal meetings need to be organised at various levels of management so as to accord opportunities to employees to express themselves freely in a conducive atmosphere, free of fear or mistrust. Management needs to make a conscious effort towards this end, without which it would be difficult to improve production and enhance productivity.

VI. CONCLUSIONS

The diagnostic study has revealed that the major problems at POI revolve around the principal areas of production and engineering.

We will, therefore, look at these two areas and highlight the critical components of the problem and its effect and the recommended remedial action plan for each of the process lines.

1.0 Solvent extraction plant

a. Process loss

The loss of hexane during the process constitutes a serious problem not only through hexane loss, but also through losses in the product itself, viz. cake and oil, both in terms of quality and quantity.

The present level of hexane loss averages around 36 kgs./M.T., and occurs due to -

* Inefficiency of heat exchangers, due to heavy scaling of tubes, leading to punctures.

* Punctured tubes

* Leaking pumps

* Malfunctioning of rotary valve at extractor inlet port

It was observed that due to careless operation, tube-well water, containing impurities and without softening, was being pumped directly into the process system.

Use of hard water is the primary cause for scaling and thereby the inefficient performance of the heat exchangers.

Recommendations were made to the management to implement the following:

i. Disconnect direct water connection from tube well to the plant.

ii. Treated water to be tested regularly to determine the total dissolved solids and all other parameters to ensure that only softened water is used.

iii. Top-up water in the cooling tower sump should also be only of soft water.

iv. Ensure fans installed in cooling towers are functioning satisfactorily. During inspection, one of the fans was not operating. A minimum drop of 5 degrees Celsius is essential.

v. Descaling of tubes and tube replacement, where deterioration is severe.

b. Hexane loss in storage and handling

Hexane is presently imported from South Africa in 210 litre steel barrels and stored in the open yard, next to the solvent extraction plant.

* Large volumes of hexane are not to be stored in drums in the open, near a processing plant, as it is a fire hazard. Hexane should be stored only in underground storage tanks, not only from the safety point of view, but also to avoid evaporation losses, which is bound to occur when drums are left in the open under the heat of the sun.

* Movement of hexane from South Africa to Lusaka is done through trucks, with the drums being off-loaded, stored and reloaded at the customs point of entry. In other words the drums are subject to multiple handling, leading to severe damage and in some cases total loss of hexane through leakage. Discussions at various levels suggest that losses due to such leakages could be around 1.5 to 2.0%.

Further enquiries revealed that although management claimed compensation for such losses through insurance companies, hitherto there has not been a single instance where payment has been received by the Company. The cumulative loss to the Company through the unproductive executive time lost in processing claims, coupled with the reduced volume of materials available for process and the severe damage to the drums clearly justifies the need for management to make changes from the present system.

The following recommendations have been made to the management -

i. Short term : Organise movement of drums from South Africa to Lusaka in container loads with the arrangement that two containers will be kept at POI's factory while a third container will be in transit. Containerised cargo eliminates multiple handling reducing damage to drums and consequent loss of the contents, viz. Hexane.

ii. Long term :

a. Examine the possibility of importing hexane directly through oil companies in Zambia who should maintain bulk stocks on POI's behalf.

b. Move hexane from South Africa by road tankers, so that hexane can be off loaded directly into the underground storage tanks.

c. Implementation of (b) will necessitate the augmentation of underground storage capacity at POI, which in any case is desirable.

Implementation of these recommendations could substantially curtail wastage leading to significant savings.

2.0 Estimated savings

a. Process

Reduction in hexane consumption from 36 kgs./M.T. to 10 kgs./M.T. of Hexane/M.T. of cake.

Savings in processing 14,500 M.T. of cake (1992-93 budget) at the rate of 26 kgs./M.T. - 377 M.T. of hexane.

Cost of hexane ex. Lusaka - approximately US $ 850/M.T.

Annual savings - 377 x 850 = $ 320,450

b. Handling & storage

Total hexane consumption @ 36 kgs./M.T.

= 36 x 14,500 kg.

= 522 M.T.

Savings @ 2% = 10.44 M.T. x $ 850

= $ 8,874 say $ 9000.00

Total annual savings = $ 329,450 per annum

A comprehensive maintenance and machinery rehabilitation programme has been worked out based on identified bottlenecks in Annexure II and plantwise maintenance programme in Annexure III.

3.0 Buhler seed preparation plant and Krupp expellers

Both these plants have been operating at inefficient levels, resulting in poor capacity utilisation and therefore low crude oil production. The capacity utilisation has been in the region of 40% only.

The plant which normally processes sunflower seeds and soya beans has a rated capacity as under -

Sunflower - 300 M.T./day
Soya beans - 200 M.T./day

The actual production during the last four years is illustrative -

	1988-89	1989-90	1990-91	1991-92
Soya beans				
Seeds crushed (M.T.)	16385	15375	11147	10579
Crude oil obtained (M.T.)	2624	2655	1820	1653
% of Crude oil	16.0	17.3	16.3	15.6
Sunflower				
Seeds crushed (M.T.)	3414	7085	5647	10958
Crude oil obtained (M.T.)	627	1901	1659	3104
% of Crude oil	18.4	26.8	29.4	28.3

Source: POI - Budget (1992-93)

The diagnostic study revealed the capacity imbalance that exists between seed intake from the silo to the seed preparation plant. This is due to persistent failure of the seed conveying elements, due to poor maintenance. The practice of PREVENTIVE MAINTENANCE does not exist and therefore the whole system needs to be systematically overhauled.

The destoner performance has been bad consistently. The carry forward contaminants have been the cause for damaging machinery components in the later part of the process.

Recommendations made to the management covered -

i. Short term

a. The frequency of the destoner vibration appeared to be inadequate to separate the stones and should, therefore, be increased. The destoner catalogue/instruction manual was not available and the adjustments would have to be made on a trial and error basis.

b. After dehulling, it is recommended that the soya seeds are transferred through a cyclone separator to separate the skin from the seed. This will help in considerably reducing the bulk for solvent extraction thereby effecting cost savings. Introduction of this procedure will further assist in prolonging the useful life of the filter. This factor should contribute not only to cost savings and improved efficiency of filtration, but also to better productivity.

ii. Long term

Systematic overhauling of the whole system is necessary. A comprehensive maintenance and machinery rehabilitation programme has been worked out based on identified bottlenecks and is presented in Annexure II while a plantwise maintenance programme is presented in Annexure III.

4.0 Improved plant performance

i. The primary objective is to progressively increase the intake of indigenously grown soya bean and sunflower seeds. With the systematic overhauling of the plant and incorporation of preventive maintenance systems the following targets for increased seed crushing should be possible:

Year	1994-95	1995-96	1996-97
Seeds crushed (M.T.)	20,000	40,000	50,000

ii. Crude oil recovery would also increase with improved efficiency of the plant.

	Soya bean seed	Sunflower seed
(%) Current average recovery -	16	28
(%) Enhanced target -	26	30

5.0 Summary

i. It is quite clear that the initial areas to be tackled by the Company are in "Engineering & maintenance"

ii. A comprehensive programme of maintenance with target dates have been drawn up and is enclosed as Annexure III.

iii. The present engineering team lacks the experience and expertise to carry out this programme effectively and to guarantee results. The Company has NO TIME FOR EXPERIMENTATION. What is required is a positive result oriented action plan.

iv. Efforts should be made to recruit two well qualified and experienced engineers with proven track records.

v. Notwithstanding what is stated in (iv) above, the Company

needs to identify an organisation which can be given a contract for a period of say three years to carry out plant repairs and maintenance and also concurrently set-up a "TRAINING SCHOOL", as recommended earlier in this report.

Action: The Consultants can recommend organisations of proven competence from India, for possible consideration to undertake the maintenance contract.

The newly recruited engineers, along with selected members from the existing team will be understudies to the experts who will be executing the contract. It is expected that after the expiry of three years, the Company will be able to maintain the required standard of performance, under its own steam.

vi. On successful implementation of the recommendations made in para (v) above, the Company should be in a position to fully utilise its installed capacity for seed preparation and crushing. This should result in increased output of cakes and consequently stock feed. This, in turn, would give a boost to livestock production in Zambia, through cheaper and plentiful availability of stock feed.

vii. The Government's privatisation policy does not permit any enterprise to enterprise arrangement on a long term basis. The Consultants have, therefore, recommended that the Company award a short term contract for tackling the areas of weakness identified by them. Once this is done POI's "marketability" under the ZPA's programme for privatisation should improve.

There is no doubt that POI has immense potential to contribute to the growth and prosperity of the Zambian economy.

ACKNOWLEDGEMENTS

There are a few persons whose unstinted support throughout the course of the diagnostic study has been of immense value, without which it would not have been possible to complete the study. We wish to place on record the services rendered by -

Mr. A.M. Kapufi	General Manager
Mr. Stanford G. Mtamira	Chief Accountant
Mr. T.R. Kawala	Production Manager
Mrs. Rebecca M.L. Katowa	Marketing Manager
Mr. C.J. Mbewe	Purchasing & Supplies Manager
Mr. Agriper Simifukwe	Acting Engineering Manager
Mr. Wallis	Farm Manager
Ms. Florence Banda	Senior Personnel Officer

Our gratitude is also due to the members of staff and workers of Premium Oil Industries Ltd., who gave their time and assistance, whenever required.

Our sincere appreciation, for the continuous guidance and encouragement given by the UNIDO Country Director, Dr. Earle A.S. Taylor.

Grateful thanks are due to many of the officials in Government and Financial Institutions whose cooperation and assistance has contributed significantly in compiling information required for the preparation of this report.

July, 1993

AMARNATH KAMATH & CO.

ANNEXURES

LIST OF ANNEXURES

I	ACKNOWLEDGEMENTS	1
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III	PLANTWISE MAINTENANCE PROGRAMME	5
IV	PROCESS FLOW SHEET	13

ANNEXURE-I

ACKNOWLEDGEMENTS

LIST OF PRINCIPAL ORGANIZATIONS, COMPANIES AND PERSONS CONTACTED BY M/S AMARNATH KAMATH & CO.

Organization/Company	Person(s) met
Ministry of Commerce & Industry	Mr. Listard E. Chambuli Banda Deputy Director, Industry Department
	Mr. D.M. Mauzu, Economist, Ministry of Commerce & Industry
	Mr. Francis Chilufya Chipimo, Economist
Premium Oil Industries Ltd.	Mr. A.M. Kapufi, General Manager
	Mr. Stanford G. Mtamira, Chief Accountant
	Mr. T.R. Kawala, Production Manager
	Mrs. Rebecca M.L. Katowa Marketing Manager
	Mr. L. J. Namatama, Process Manager - Soap
	Mr. Funda Funda, Process Manager - Edibles
	Mr. C.J. Mbewe, Purchasing & Supplies Manager
	Mr. Agriper Simifukwe, Acting Engineering Manager
	Mr. Wallis, Farm Manager
	Ms. Florence Banda, Senior Personnel Officer
UNIDO	Dr. Earle A.S. Taylor, Country Director, Zambia
	Mr. Winston Mutale, Rural Industry Development Project
	Mr. K.D. Jorgensen, Programme Officer

ANNEXURE-I (2)

United Nations Development Programme	Mr. Onder Yucer, Resident Representative, Lusaka
Food & Agriculture Organization of the United Nations	Mr. Bjarne Thomsen Programme Officer
	Mr. Genaro J. Clemor, Management Information System Advisor, Lusaka
	Mr. Manohar Subramaniam, Chief Technical Adviser
	Prof. Ben Kiregyera, Agricultural Statistician
Department of Census and Stastics	Mr. Christopher J. Chitalima, Statistician
ROP Limited	Mr. R.H. Thanawalla, General Manager
	Mr. Cosmas L. Chulu, Manager - Support Services
	Mr. S.K. Saxena, Chief Engineer
Zambia Confederation of Industries and Chambers of Commerce	Mr. Bernard Chisanga, Chief Executive
Indeco Limited	Mr. K.C. Mubita, General Manager - Economic Evaluation and Corporate Planning
Zambia Privatisation Agency	Mr. S.C. Mwamba, Acting Deputy Director
	Mr. S. Syamuleya, Administration and Secretarial
Indo Zambia Bank Ltd.	Mr. S.R. Krishnan, Managing Director
Bank of Zambia	Mr. Godfrey Mbulo, General Manager
International Labour Organisation	Mr. S. Odero - Oteng, Regional Vocational Training Adviser
Office of the President	Hon. Dean N. Mungomba MP, Deputy Minister, Planning & Development Corpn.

ANNEXURE II

IDENTIFIED BOTTLENECKS

BOTTLENECK	EFFECT
OIL MILL	
All mechanical chain conveyors badly wornout beyond repair	Seed conveying capacity drastically reduced, consequently adversely affecting normal throughput rate
Seed pre-cleaner out of service due to lack of spares	Seed blowers 1 and 2 performing ineffectively as the seeds have higher % age of foreign matter which eventually overloads the main seed cleaner and results in excessive dust inside the factory
Automatic seed weigher frequently breaks down. Fault timers, auto-batch auto-batch recorder etc. have been malfunctioning	Material reconciliations difficult and inaccurate
De-stoners inefficiently separating sand and stones	Results in wear of machine parts in the process following
Seed cleaner screening mesh torn and not replaced	As above
Dust extraction fans - efficiency drastically reduced. Fan blades wornout beyond redemption	Excessive accumulation of dust in the plant. A serious health hazard & environment pollutant
De-corticators cannot dehull the small hybrid seeds since seeds are presently not graded. In fact, a dehuller is available, but has not been installed	Maintaining acceptable level of fibre in the seed meal becomes difficult, resulting in lowering quality of meal and loss of some seeds with the hulls
Hull separators are not performing to expectation since some hybrid seeds are not decorticated.	As above
Seed conditioners - not supplied with all the required accessories Driving vee belts (inadequate), pressure and temp. gauges faulty, steam lines leaking & valves faulty	Controlling and maintaining process parameters becomes difficult

ANNEXURE II (2)

IDENTIFIED BOTTLENECKS

BOTTLENECK	EFFECT
Expellers frequently breakdown. Lack of pressure worms, cage bars, scrapper knives, spacers, etc. have resulted in most downtime and low plant availability. Also faulty panels	Plant utilisation low.
Open steam lines, leaking steam valves, unlagged steam vessels	High energy loss
Lack of process input measuring utilities like volumetric meters, level indicators, etc.	Inaccuracies in mass balance determinations
SOLVENT EXTRACTION PLANT	
Leakages through punctured heat exchanger tubes, hexane pre-heater, steam economiser, distiller and leaking miscella pumps	Abnormal hexane loss
Ineffective hydroclone for miscella filtration. Original rotary filters being considered for re-installation	Too much fines in the oil for refining causing frequent blockages
Excessive scaling of cooling water pour-rings due to using hard water	Inefficient condensation of hexane vapors due to poor heat transfer
CAKE SHED	
Auto-batch weigher malfunction	Inaccurate product output recording
Malfunctioning stitching machine	Poor closing of meal bags thus allowing for spillage/waste
OTHERS	
Hull disposal using hired trucks	Very costly
Leaking factory roof	Plant is shutdown whenever there is a heavy downpour
Water ingress into elevator pits	Plant has to be shut down to clear elevator pits
Inadequate steam du to low water supply from own bore holes	Persistent plant shutdowns

ANNEXURE III

PLANTWISE MAINTENANCE PROGRAMME

SOAP PLANT

Sl. no.	Description of problem	Action plan	Materials required (Nos.)	Target date 1993
1.	SOAP PUMP for pans 1, 2 & 3 is too large Currently, only small pans are in use resulting in insufficient soap settling, as soap is being frequently drawn	To purchase one mono pump	Mono pump (1)	July
2.	PISTON VACUUM PUMP - The pump has broken down. Currently using the bleacher vacuum pump. When bleaching process starts, soap drying will be a problem	To overhaul or purchase one vacuum pump	Vacuum pump (1)	July
3.	SOAP PRESSURE PUMP - The running pressure pump has a lot of problems from wear and tear. New one urgently required because once it breaks down production will be stopped for a long time	To overhaul the stand by pressure pump or purchase a new one	Soap pressure pump (1)	Mid. April
4.	MOTORS Only 2 fan motors are in operation The other two are down. This greatly affects production as cooling water heats up due to ineffective cooling	To purchase appropriate motors for the fans or modify the system	Motors (2)	Febr.
5.	VARIABLE SPEED MOTORS for the Mazzoni plodders. The original motors were removed after a problem. The present motor cannot change speed and therefore output is static. This has reduced output from 1.5 mt/hr. to below 0.9 mt/hr.	To purchase variable speed motors for the main plodder and the twin plodders	Variable speed motors (2)	April
6.	T.V. CUTTER - The available TV cutter is out of order. New TV cutter urgently required for: a) Increased speed in soap cutting, especially when the variable speed motors are procured b) For uniformity and standard cutting of soap. This will again help reduce manpower on this job	To purchase one TV cutter	Adjustable speed, TV cutter (1)	April
7.	SOAP PUMP - for transfer from pan room to crutcher pot. The pump though running well needs a stand-by. Should it pack up, production will stop	To purchase stand-by pump	Mono pump (1)	May

ANNEXURE III (3)

PLANTWISE MAINTENANCE PROGRAMME

SOAP PLANT

Sl. no.	Description of problem	Action plan	Materials required (Nos.)	Target date 1993
8.	CAUSTIC PUMPS - Only one out of the two is running. One stand-by is urgently needed to avoid production hold up in case of breakdown.	To source & purchase caustic pump	Pump required: centrifugal Chemical pump (1)	June
9.	FLOW METERS - Measurement of fluid materials in the plant is not accurate due to lack of flow meters. This has often led to large variances due to erratic readings obtained.	To source & purchase flow meters. They are urgently needed	Gauges for: Tallow (4) Soap Stock (1) Caustic (2) Brine solution (3) Glycerine (4)	Febr.
10.	TEMPERATURE GAUGES AND STEAM GAUGES - Very few gauges in the plant are functioning -	To purchase temp. and steam gauges	Gauges (8)	Febr.
11.	SOAP DRIER (Weathering machine)	To purchase one soap drier (weathering) unit)	Soap drier (1)	
12.	MILLING MACHINE - One milling machine is required for the toilet soap line. The existing one is worn out	To purchase one complete unit or overhaul the existing one	Milling machine (1)	Aug.
13.	VARIABLE SPEED MOTOR - For the toilet soap line plodder. Currently, the speed is unadjustable	To purchase original variable speed motor	Variable Speed Motor (1)	Aug.
14.	T.V. CUTTER - One TV cutter for the toilet line will definitely be required. The Mazzoni TV cutter will be fully occupied by work at the Mazzoni therefore leaving no opportunity for its movement to the toilet soap line	To purchase one unit TV cutter from suppliers	Speed adjustable TV cutter (1)	Aug.
15.	SOAP STAMPING AND WRAPPING MACHINES - Currently, the toilet soap line has no stamping and wrapping machine	To purchase such machines	Stamping Machine (1) Wrapping machine (1)	Aug.

ANNEXURE III (3)

PLANTWISE MAINTENANCE PROGRAMME
OIL MILL

Sl. no.	Section	Description of problem	Action plan	Materials required (Nos.)	Target date 1993
1.	New silos	Seed carry over below suction line in new silos	Modify for easy draining of seeds	Chain conveyor system	June
2.	Old silos	Fatigue failure in all silo chain conveyors Nos. 1,3,4, 5,6,7,8,9,10 & 12	Replacement	New Chains	June
3.	Seed intake bins	Not in use	Should be put in use	Level motors, cup elevators, and electrical connectors	June
4.	Buhler	Existing seed weigher getting stuck occasionally	Weigh only after cleaning seed. If not replace with the simpler mechanical scale	Rehabilitate old mechanical seed weigher	March
		Seed cleaner leaking badly	Fit new screens and covers	Screens, covers, rubber fittings, rubber hulls, etc.	March
		Too much dust in the plant	Put in position motor of Fan No. 147 Dismantle all dust respirator channels and unblock	Extraction fans	March
		Too many stones going with beans and wearing out flaker rolls and expeller worms	Destoners should be dismantled, cleaned, installed & set to proper angle and vibrations	To replace broken pressure hydrometers, etc.	March
		Too many whole seeds, especially hybrid going with meats	Replace worn out Dehuller knives and install impact dehuller	New knives	Feb.
		Leakages and droppings	Inspect and replace all worn out screw conveyors & seal all leaking troughs	Sheet plates	March
		Fatigue failure snapping elevators 101,103,208,210	Replace worn out cups, bolts, belts	Cups, belts, bolts	March
		Worn out separating screens	Replace worn out separators, screens & pan sifters	Specified screens	March

ANNEXURE III (4)

PLANTWISE MAINTENANCE PROGRAMME

OIL MILL

Sl. no.	Section	Description of problem	Action plan	Materials required (Nos.)	Target date 1993
	Buhler Cake bagging plant	Frequent breakdowns of sewing machine	Replace New Long sewing machine	New Long sewing machine	June
		Frequent breakdowns of bagging scale giving wrong weight readings	Replace weighing machine	New weighing machine	June
		Frequent breakdown of conveyer belt	Replace	Conveyor belt	June
		Jumping elevator	Replace worn out belt and cups	Cups & belt	June
		Congestion in shed	Extend shed area	-	June
5.	Krupp	Snapping elevators No. 23 and No. 37	Replace worn out chains, u-bolts and cups	Chains, Cups and bolts	June
		Leaking meats and droppings, poor extracted meats, blockages of equipment and poor cake quality	Inspect and replace worn out screw conveyors & patch up troughs. Replace worn out expeller worms, cage bars scrappers & shafts	Sheet plates Shafts Expeller worms, cagebars,spacers, scrappers, hydraulic pumps, shafts	June June June
6.	Electrical components	Plant can't start on automatic mode. Delay in repairs due to lack of spares	Stock electrical spares such as fuses, contactors, timers, etc. for control panels	Fuses, contactors, timers, seals etc.	March

ANNEXURE III (5)

PLANTWISE MAINTENANCE PROGRAMME

SOLVENT EXTRACTION PLANT

Sl. no.	Section	Description of problem	Action plan	Materials required (Nos.)	Target date 1993
1.	Extractor - proper	Extractor breaking down frequently	New spare drive chain, new sprockets and new gear box	New chain, sprockets and gear box	June
2.	Pumps	Leaking hexane, miscella	Replace all old pumps with new ones	New pumps	
			Get appropriate seals	New seals	June
3.	Pipes, valves steam traps	Leaking steam and condensate	Replace leaking valves, pipes & steam traps, wornout pipes with new ones	Valves, steam traps, pipes	June
4.	CMB condensers	Corroded & scaled tubes leading to high hexane consumption	Replace damaged tubes with new ones.	New tubes of correct material	June
5.	Water softener	Use of hard water leading to corrosion and scaling	Install new independent water softening plant(Resin type)	New water softening plant	June
6.	Water cooling system	High temperature of cooling water reduces rate of condensation	Install new cooling towers to replace the existing CMB model. Minimum temp. drop required is 18 deg C	New cooling water towers	June
7.	Oil coolers (Plate type)	Extracted and mineral oil not sufficiently cooled	Inspect and replace worn out plates	New plates	June
8.	Diesel pump	No cooling during power failure	Rehabilitate and install diesel pump	Get spares or buy new diesel pump	June
9.	Vacuum pump	Failure of vacuum	Replace as required	Vacuum pump (spares)	June
10.	DT condenser	Existing DT condenser too small and heats up resulting in high hexane loss	Replace existing one with larger condenser	New bigger shell	June

ANNEXURE III (6)

PLANTWISE MAINTENANCE PROGRAMME

SOLVENT EXTRACTION PLANT

Sl. no.	Section	Description of problem	Action plan	Materials required (Nos.)	Target date 1993
11.	Lagging	Poor insulation & heat loss	Lag all heating units, eg. stripping column	Fibre glass	June
12.	Sight glasses	Flow rate of water, hexane and miscella not known	To replace broken ones	Sight glasses of appropriate sizes	June
13.	Hexane flow meters and recorders	Unable to determine amount of hexane flow into system and recovery. Not possible to estimate hexane consumption accurately	Install hexane flow meter/recorders	Flow meters recorders at input & recovery stages	June
14.	Hexane day tank	Hexane in the underground tank is getting contaminated and computation of hexane consumption is inaccurate	Install a new hexane day tank on the ground level and isolate the existing underground tanks which could be used for storage only	New day tank of reasonable size	June

ANNEXURE III (7)

PLANTWISE MAINTENANCE PROGRAMME

REFINING PLANT

Sl. no.	Description of problem	Action plan	Materials required (Nos.)	Target date 1993
1.	Poor quality of local crude oil (i.e. high gum content)	Degumming unit to be rehabilitated for the purpose of cleaning the oil	As described in engineering proposal	April
2.	Poor housekeeping resulting from poor flooring in most of the plants and leaking roofs	Reflooring of entire place Re-roofing proposal by engg. dept.	Terrazzo flooring as well as ceramic tiles.	March
3.	Poor metering of process materials esp. oil	Provision of proper & accurate metering system	Oil flow meters(2)	April
4.	Simple maintenance by operators not possible due to lack of tools	Provision of adequate tools	Tool boxes (3)	Febr.
5.	Inadequately filtered finished oil being packed	Installation of extra filtering system after filling room tanks	Polishing filter (1)	May
6.	Dust as well as poor ventilation in most areas of the plants	Improve ventilation system	Expeller fans (20)	June

ANNEXURE III (8)

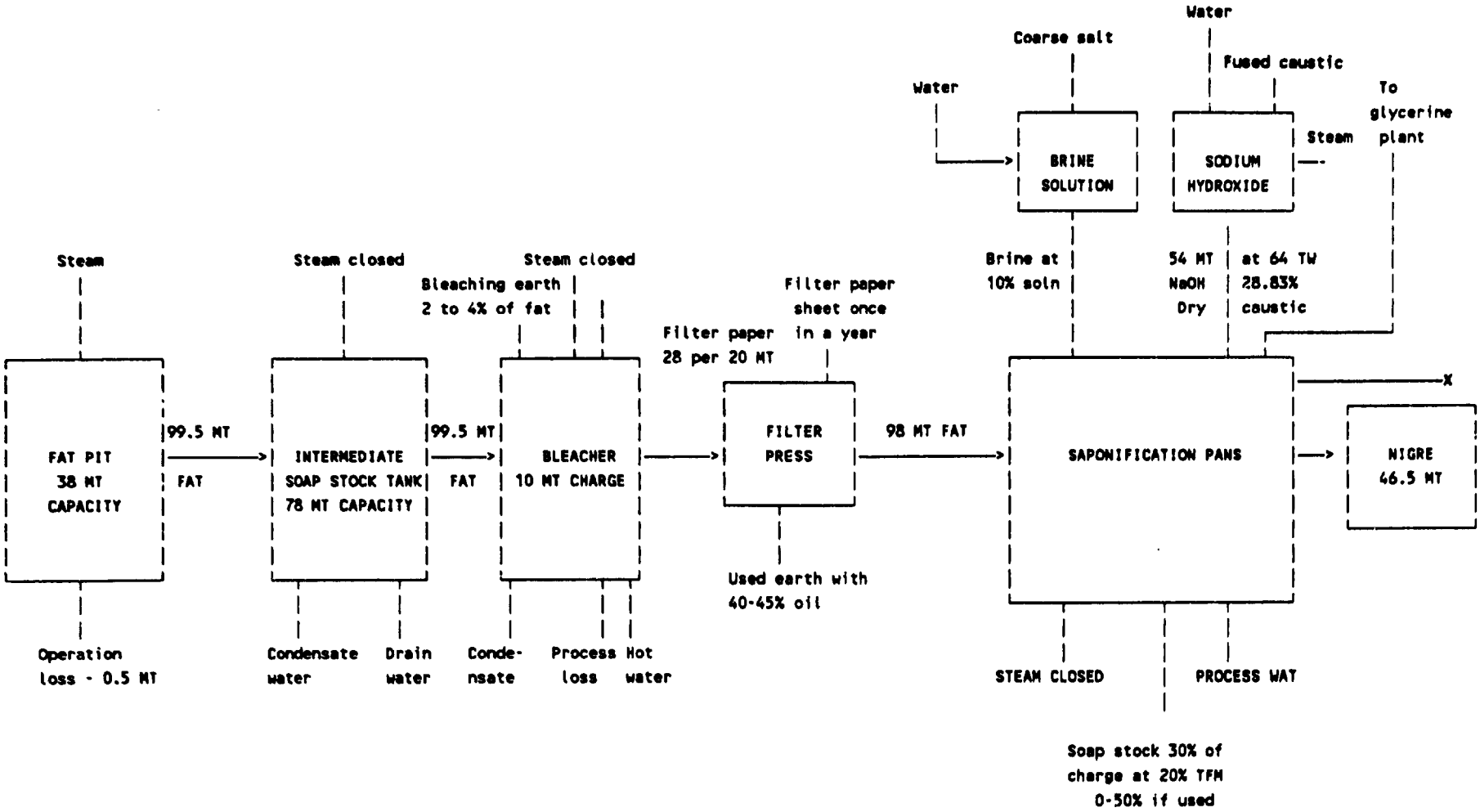
PLANTWISE MAINTENANCE PROGRAMME

GLYCERINE PLANT

Sl. no.	Description of problem	Action plan	Materials required (Nos.)	Target date 1993
1.	COOLING COIL is urgently needed in the lye treatment tank. This is to reduce the long cooling time of heated lye. Hence, it will speed up operations	To purchase pipes for the cooling coil	Stainless steel pipes	Febr.
2.	MULTI STAGE PUMP for water extraction in the vacuum tank of the glycerine evaporators. Delays are noticed here as the pump available cannot pump against vacuum	To purchase one pump for this purpose	One 2 Stage pump	May
3.	Vacuum leakages through gasket in salt boxes and evaporator manholes	To purchase one roll or sheet to cut rubber gaskets	One roll of rubber sheet for gaskets	May
4.	SALT PIPE LINE to be put up to join the salt dissolving pump. This is to speed up salt movement from the glycerine tank to the brine solution tank	To purchase pipe lines for the job	Preferably stainless steel pipes to be procured	Jan.
5.	LEVEL INDICATOR in the evaporators/ vacuum tank is out of order	To purchase one level indicator	One level indicator	April
6.	FLOW METER - Flow measurement of glycerol not available	To purchase flow meter	Flow meter	April
7.	Failure of mono-pumps during transfer of soap stock to new refinery	Provide standby pumps	Mono pumps	June
8.	Poor lighting in some areas. Affecting operations during night shifts	Provision of adequate lighting	Fluorescent tubing	March
9.	Neutralising of oil/fats done using bleacher at old refinery	Rehabilitation of old refinery plant		Aug.
10.	Security at old refinery inadequate due to poor facilities	Provision of security doors & burglar bars at important points	Security doors, bars	Febr.

ANNEXURE IV

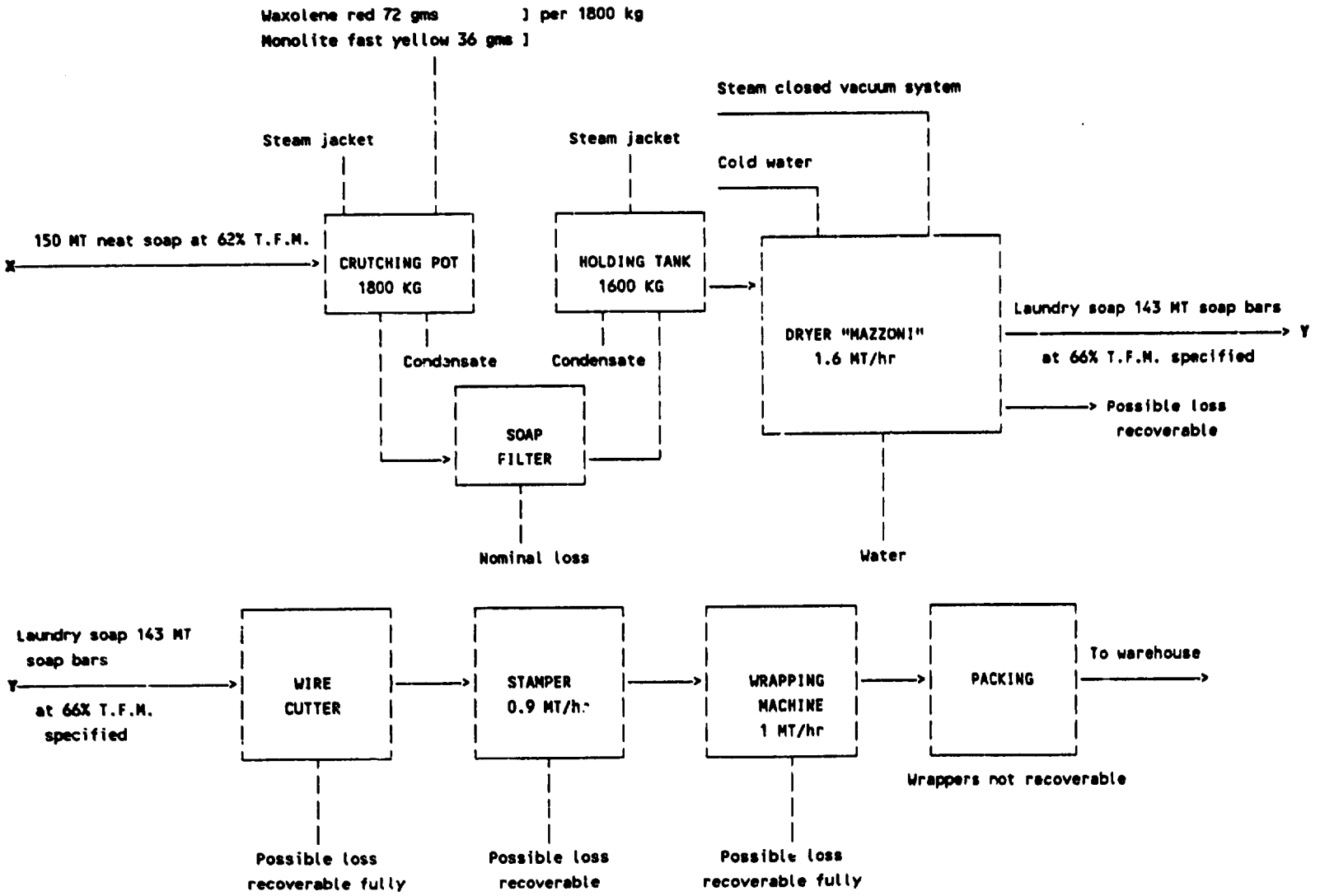
PROCESS FLOW SHEET FOR SOAP



MT - Metric Tonne

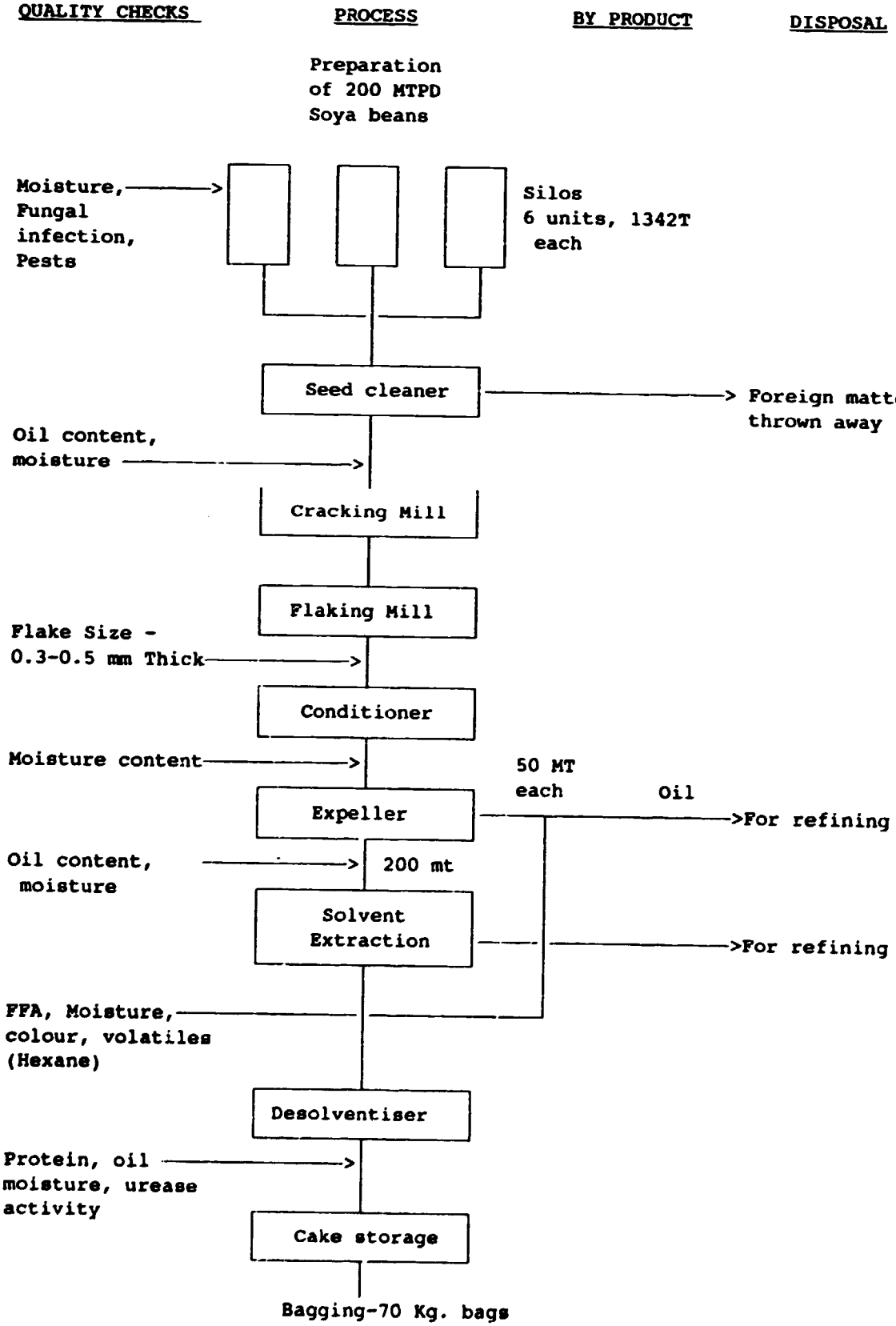
ANNEXURE IV (2)

PROCESS FLOW SHEET FOR SOAP



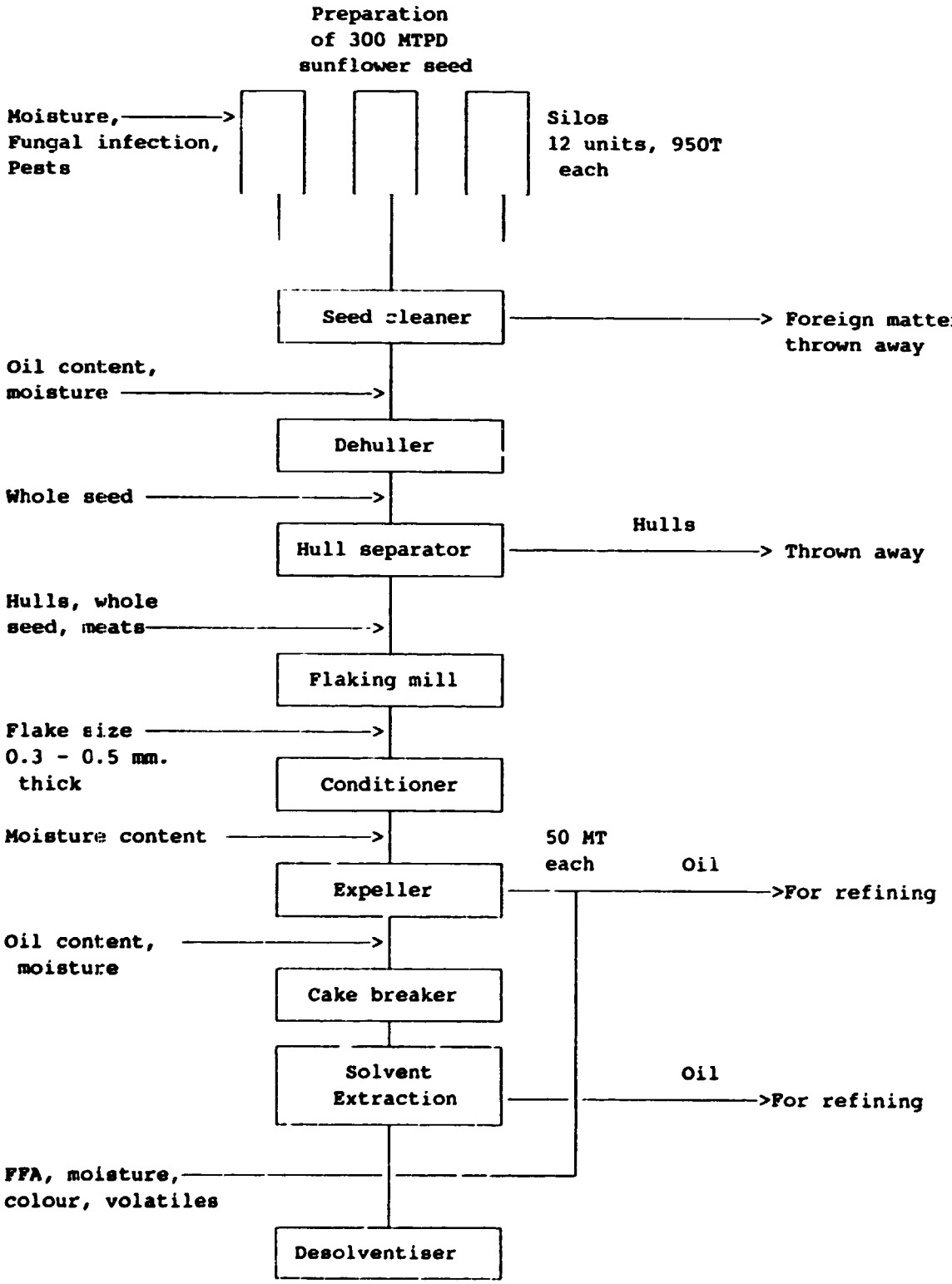
ANNEXURE IV (3)

PROCESS FLOW SHEET FOR SEED CRUSHING & OIL REFINING - SOYABEAN



ANNEXURE IV (4)

PROCESS FLOW SHEET FOR SEED CRUSHING & OIL REFINING - SUNFLOWER SEED



ANNEXURE IV (5)

PROCESS FLOW SHEET FOR OIL REFINING - IMPORTED CRUDE OIL