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CRITICAL ASSESSMENT OF THE STATUS

OF

NIGERIAN NEWSPRINT MANUFACTURING CO. LTD.

AND

RECOMMENDATIONS FOR IMPROVEMENT

for

UNIDO
Chemical Industries Division
Vienna, Austria

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0. SUMMARY

This assessment bases on

- information received from NNMC (Nigerian Newsprint Manufacturing Co.) and
- data obtained, and own observations made by HRAG (Hans Rahm Ingenieurplanung AG on behalf of UNIDO)

during the field visit in August '91.

As far as the wood supply is concerned, logging concessions for 11'000 ha Gmelina plantations ensured the mills wood supply until now.

In the meantime, NNMC has started a Program of planting of 1500 ha/a over a period of 8-10 years, with an intended exploitation cycle of 7-8 years.

These plantations are at a distance of about 45 km from the millsite, on leased land.

With an expected mean annual increment of about 23 m^3/ha.a, these plantations will be able to take over the wood supply after the state-owned concessions are abandoned.

The mills trial plantation of pine wood for future long fiber resources should be continued.

Water is available in abundance from the Cross River.

All power is generated at site from oil (LPFO grade).

The market for newsprint and "improved newsprint" for printing and writing purposes (exercise books) is predominantly local. NNMC's target, however, is to increase exports to neighboring countries.

The local market's capacity is estimated to absorb the mills production potential, approx. 80'000 t/y, i.e. the mill will not be forced to export due to insufficient local markets.

Technically the mill itself consists of a CMP-3-stage refiner pulp mill, and a 2 paper machine newsprint mill with all required auxiliary plants, like woodyard, purchased pulp and chemicals preparation, 3 80 t/h steam boilers, 2 extraction condensation turbogenerators of 30 MW, stores, workshop and laboratories.

The mill gives a well maintained impression, except for those deficiencies which are attributable to missing spare parts.

Although its design capacity is 300 fmt/d (100'000 t/y) and the average output 240 fmt/d (80'000 t/y), the mill never reached more than approx. 40% of the average yearly output. These is, however, sufficient evidence for its capability to run at 240 t/d plus capacity.

A remarkable operational deficit of the mill is the high effluent losses which has its main reasons in the very irregular mill operation.

The main reason for the low output is, however, the working capital position of the mill. It has been completely inadequate since the commisioning of the plant. No adequate funds were provided to cover the initial cash requirements to build up inventory levels and finance debtor balances for reaching a profitable sales volume. Accumulated losses contributed further to a widening of this gap. The poor working capital situation has also caused constant disarrays and irregularities of the supply of spare parts, chemicals, fuel oil and LF pulp which were further aggrevated by interferences due to commercial interests beyond the managements's control.

The assessment of the projected financial requirements of NNMC assumes that the domestic paper market can absorb the annual production of 80'000 tons of newsprint and mechanical printing. It considers the capital costs and the net working capital requirements. The capital costs are estimated at US $ 7,2 mio, and the additional working capital at approx. US $ 15,8 mio, totalling at approx. US $ 23 mio.

The tentative financing plan assumes a state capital injection of Naira 200 mio and loan financing of Naira 50 mio at 15% interest rate.

The cash flow projection is made in nominal terms. They have been computed by applying the average price escalation rates which have been established from past price developments. The projection indicates a positive impact, if the envisaged sales volume can be realized. But the present cash flow demonstrates a limited capacity to absorb any additional financial burden. If, however, the 1991 paper prices are raised as proposed by the NNMC management, this could considerably improve thefinancial picture.

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Approved by: .....
H. Rahm

1. INTRODUCTION

The **UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION, Vienna, Austria, (UNIDO)** has requested **HANS RAHM INGENIEURPLANUNG AG, Männedorf/Zürich, Switzerland (HRAG)** to provide advisory services for the **NIGERIAN NEWSPRINT MANUFACTURING COMPANY LTD. (NNMC) in Oku Iboku, Nigeria.**

The "Terms of Reference" of UNIDO for HRAG's work base on the findings of UNIDO's mission to Nigeria in March/April'89.

As HRAG has carried out in 1990 already certain evaluations and advisory services for one of the other Nigerian pulp and paper mills, viz. the IWOPIN kraft pulp and writing and printing paper mill, various information about location and conditions were available and could be used for this assessment.

During implementation of the work very valuable assistance has been provided by the NNMC management and technical staff.

Sincere thanks are expressed for the time and effort spent by NNMC to support the UNIDO/HRAG team's work as well as for the great hospitality of NNMC which made the mission a very memorable event.

2. METHODOLOGY

As stated in the T.o.R. the advisory services of HRAG were required to assess a variety of present problems of NNMC, and in particular those connected with:

- raw material supply in general, and imported pulp in particular,
- the safety program of the mill,
- the training and up-grading of qualification of supervisory personnel and operators,
- operational matters, like capacity increase, effluent control and energy management.

In order to familiarize the specialist team prior to the field visit with the mill and forestry operation, a questionaire was prepared and mailed to NNMC.

The initial briefing of HRAG took place at the UNIDO offices in Vienna, and the information as available there were collected.

After the questionnaire's return to HRAG, the team spent the field visit at the NNMC mill in Oku Iboku, Akwa Ibom State, in Nigeria.

Own observations at the site, as well as the information received from the mill management and staff were collected and preliminarily valued.

Out of this valuation, the scope of the assessment has been slightly modified by HRAG, to better suit the actual problems as identified at the mill and the corresponding advisory services required:

- A brief, review of the market situation has been added, also taking the other paper grades produced (mechanical writing and printing papers) into account.

- A review of financial indicators has been added, to identify the mills economical situation.

- A review of the spare parts and consumables ordering and supply situation has been included.

- The advisory services on safety program matters have been dropped, after it became apparent that the mill has a low low accident rate and no special problems in this context.

The table of contents of this report has been structured accordingly.

It is to be mentioned, however, that the various subjects of the assessment could not be exhaustively covered by this mission. They would require a more detailed, in-depth follow-up, in order to support and/or verify the findings contained in this report.

For reference purposes, a tentative scope of the recommended subjects for detailed assessment has been developed and is contained in Annex A-10.

This report is structured to give a condensed run-down of the results of the findings on the present situation, as well as short-term and long-term propositions and/or recommendations for the specific problems.

Details of status and recommendations can be found in the respective Annexes.

3. RAW MATERIALS AND UTILITIES

3.1 Wood

Status

The wood used by the mill is planted Gmelina arborea.

NNMC has three logging concessions in Cross Rivers state-owned Gmelina plantations, covering in all about 11'000 ha, which have been started in the early 70's. Due to the delays in start up, the plantations were not in a good condition at the time the mill actually started consuming wood.

The standing volume is estimated at about 130 m^3/ha.

More than one third of the plantation area is at a distance of more than 200 km from the millsite, with correspondingly high hauling cost. The remaining plantations are at distances between 25 and 45 km. At the projected production, up to and including the year 1995, of 80'000 $_3$ft/a paper, an annual consumption of about 210'000 m^3/a wood is required, so that appr. 1'600 ha/a would have to be felled.

Assuming a straight line increase from the present 80'000 m^3/a to the projected 210'000 m^3/a, the 7000 ha close-by plantations alone would be sufficient for about 6 years operation on the basis of the present inventory, not counting the continuing growth.

Although the state-owned plantations were established with the paper mill in mind, it was not foreseen that the paper mill would retain its cutting concessions in perpetuality. After coming onto stream the mill was supposed to establish its own plantation.

In the meantime, NNMC has started a program of planting of 1500 ha/a over a period of 8-10 years, with an intended exploitation cycle of 7-8 years.

These plantations are at a distance of about 45 km from the millsite, on leased land.

With an expected mean annual incremant of about 23 m^3/ha.a, these plantations will be able to take over the wood supply after the state-owned concessions are abandoned.

Precondition is, of course, that NNMC can continue this program which is actually in danger due to lack of funds.

NNMC also made a few experimantal plantations of long fiber wood (Pinus caribbea) with limited succes. These efforts are continued.

Recommendation

Financing of the mill's plantation program for the establishment of 1'500 ha/a new Gmelina plantations should be secured with high priority.

As far as long-term aspects are concerned, the idea to include refining of longfibered pine wood may be followed up, under the condition that availability, logistics and costs of transportation of this wood prove its viability. A certain reduction of the portion of (imported) longfibered (LF) pulp may then be expected.

The continuation of the pine plantations and their optimisation is therefore advisable.

3.2 Long Fibered (LF) Pulp/Other Fibers

Status

NNMC uses approx. 18% LF pulp in the furnish, to provide the strength properties required for the paper sheet. This pulp is imported. (13'800 t/y at 240 fmt/d mill output).

The mill has carried out, in the past, series of pulping tests with varying parameters for impregnation and refining, to identify the optimum pulping conditions as far as the Gmelina - CMP-pulp is concerned, with the goal of reducing the quantity of longfibered pulp. The approx. 18% in the furnish is the result of such tests.

Supply shortages in general and the unsatisfactory regularity of supply of LF pulp in particular have repeatedly caused interruptions of production and corresponding down times. Reasons for such irregularities were reported to be interferences by commercial interests beyond the mill management's control.

Moreover, financial bottlenecks prevented proper and timely ordering, payment and receipt of the LF pulp.

No local sources of virgin bleached or semibleached LF pulp exist in Nigeria.

Certain selected grades of waste paper would be suitable to substitute longfibered virgin pulp. Quantities available in Nigeria, however,are far too small to be considered by NNMC, besides the fact that, to all present knowledge, no proper collection, baling and trading system exists in Nigeria.

Recommendation

There is no real deviation from the present practice of NNMC to be recommended. A steady attention towards minimizing the LF pulp portion in the furnish is the only realistic approach. Besides this, the improvement of the financial situation and the elimination of interfering commercial interests outside the mill management would be essential to improve the mill operation.

This applies to both short term and long term approach.

3.3 Chemicals

Status

All chemicals required for pulping, bleaching and paper-making must be imported, except alum.

The chemicals and additives are

- caustic soda (2'800 t/y)
- sodium sulfite (1'300 t/y)
- hydrogen peroxide (1'300 t/y)
- clay (2'400 t/y)
- slimicides, antifoam agents, paper dyes, retention aids, etc..

Since the start-up of the mill, the supply of these chemicals has been in constant disarray due to organizational and financial bottlenecks. As in the case of LF pulp, this has lead to production interruptions and downtimes.

Recommendations

Similar to the LF pulp supply situation, the removal of the organizational constraints are the remedy to cure the shortcomings of the chemicals supply situation.

As far as the long term measures go, the generation of peroxide at the mill site, using recently developed technologies, may be envisaged.

3.4 Water

Status

Water is pumped from the river (Cross River) at about the capacity of the water treatment plant, i.e. at about 34'000 m^3/d, more or less regardless of the quantity of paper produced. This leads to excessive specific water consumption (in the range of 100-300 m^3/t of paper) which in turn causes

- unnecessary high consumption of power for pumping,
- high water treatment chemical consumptions,
- high load on the effluent treatment,
- high fiber losses.

Recommendation

As all major equipment of the mill appear to be properly sized and sufficiently well maintained, the high water consumption is primarily caused by carelessness of the operation peronnel towards economical use of fresh water.

Corresponding education and training would be required to create the alertness on all levels of operational personnel.

Besides this, an engineering and process assessment should be conducted to identify, or confirm, the size of the white water storage capacity within the papermachines/stock preparation circuits and the potential for improved internal water recirculation in the mill.

Too small buffers cause unnecessary overflows of white water and, consequently, high quantities of make-up fresh water.

As a target, the specific water consumption at normal production rate should not exceed 20-30m^3/t.

3.5 Energy

Status

Energywise, NNMC is an island operation, i.e. there is no power supplied from or fed to the national grid.

All power is generated from oil (LPFO grade) for steam boilers and diesel oil for the standby/emergency diesel generators.

A recurrent reason for interruption of power production is the of LPFO oil.

This is explained as being due to the same reasons as for LF pulp and chemicals, plus additional problems (shutdowns) in the Nigerian refineries.

Recommendations

The recommendations to cure the situation as far as the financial problems of the mill are concerned are similar for LF pulp and chemicals.

A short-term remedy to the supply shortages of the refineries may be by the installation of additional oil storage tanks at NNMC to keep a higher storage level.

Another possibility is envisaged by NNMC: To convert the boilers to the use of Natural Gas. Apparently, large amounts of this gas are presently wasted by flaring-off.

Details to supply logistics and costs should be identified or confirmed immediately.

4. MARKET

(For details refer to Annex A-4)

The following is brief and incomplete review of data and observations collected on market conditions for newsprint and mechanical writing and printing papers. They base on spot information available in Nigeria. It is intended to serve as "starting input" for an in-depth market survey to be carried out in Nigeria and possibly the neighbouring countries. It further serves as an indication for the present and future market situation and problems.

4.1 Newsprint

The supply situation during the recent years was as follows:

fmt/year	85	86	87	88	89	90
NNMC newsprint production	-	13'420	18'40	20'050	22'780	31'100
Imports	14'790	(?)	2'950	260	1'390	30
Total	14'790	13'420?	21'350	20'310	24'170	31'130

From this table it appears as if the Nigerian newsprint market may saturate somewhere around 30'000 - 35'000 t/y.

This is, however, not believed to be a realistic conclusion because

- apparently, a restrictive government policy towards imports has been applied during the recent years due to the overall economic situation of the country;
- according to NNMC management, the daily issues of newspaper are limited in volume (no. of pages) due to the non-availibilty of newsprint. As soon as this shortage would eliminated the consumption would raise considerably. ("frustrated demand")

As former World Bank reports* expect a potential of approx. 75'000 fmt/y of newsprint consumption in future it may safely be assumed that the NNMC mill's capacity will to be able to cope with the country's demand for the years to come.

* Technical report "World Bank Industrial Sector Mission, Pulp and Paper Making Sub-Sector, N.N.M.C., June 1989

4.2 Mechanical Writing and Printing Grades

Except for a small quantity (approx. 3'000 - 5'000 t/y) of writing and printing papers produced by the Jebba Mill, no such paper is produced in Nigeria.

The imports of writing and printing papers declined over the years as follows:

fmt/y	85	86	87	88	89	90
	113'000	86'500	58'200	63'100	31'200	54'100

As the quantity produced by the Jebba Mill may be assumed to be more or less steady and as NNMC's share of sales a mechanical writing and printing grades is roughly 10-15% of the total production, a sharp decline of the country's writing and printing paper consumption can be stated.

The reasons for the reduction of imports can be assumed to be the same as for newsprint, i.e. the restrictive policy of the Government.

It may thus be assumed that the demand is considerably higher than the supply and it would not be a problem to sell higher amounts of lower grades writing (school/exercise books, etc.) and printing papers from NNMC once the production of the mill increases.

An interesting feature is the large number of individual customers and the generally very small individual quantities of paper sold to them. This is not at all the normal practice for a newsprint mill, and is deemed to be an indication for the peculiar situation of a market which is not demandsupply controlled but influenced by regulations.

4.3 Exports

In the light of the above, i.e. the expected real domestic demand for newsprint and mechanical writing and printing papers, export considerations would not be of particular short-term(?) interest.

Regarding the point of foreign currency earnings required to compensate for the respective spendings to import chemicals and LF pulp, it must be borne in mind that the foreign exchange savings created by the mill's paper production more than offset the spending for the imported raw materials and therefore exports are not considered compulsory for this mill.

5. OPERATIONS AND EQUIPMENT

5.1 Woodlands, Forestry

Status

The mill has the full management of about 11'000 ha state-owned Gmelina plantations (see Annex A-3 for areas and age classes). This includes maintenance, periodical cleaning, thinning of the coppiced areas, extraction of wood and re-planting.

Virtually all felling, skidding, bucking and hauling is done under the supervision of the mill's forestry department with mill owned equipment (see Annex A-3 for the major equipment) and mill employed permanent and casual personnel. A minor quantity of wood is felled by contractors. Felling, delimbing and bucking to 2,4 m length is by chainsaw. Some felling is done by feller-bunchers.

The logs are skidded to loading points and loaded on trucks and trailers by mobile hydraulic loaders.

During the rainy season with unfavorable road conditions, the wood extraction is limited to the accessible plantations.

Due to the low wood consumption by the mill, part of the plantations is over-mature and the logs are too thick to pass the chipper spout without size reduction.

The maintenance of the forestry equipment is done in a separate workshop. The availability of the equipment is badly affected by the lack of spare parts and consumable supplies and a significant number of equipment is presently out of service (see Annex A-3). Nevertheless, up to now the wood supply was no constraint for the (limited) mill production.

Recommendation

As an immediate action, the supply of spare parts and consumable supplies for the forestry equipment must be normalized and the now idle equipment must be reconditioned in order to allow a sustained supply of wood when the mill is operating on a normal basis, i.e. with 90-100% capacity utilisation. The funds required are stated under 7.2 below.

In the long run it may be advantageous to gradually shift the forestry operations and wood hauling to contractors, limiting the own operations to supervision and plantation management. As an interim step tree length extraction and hauling could be studied and tried, as proposed by the NNMC management. Hence no particular equipment alterations are foreseeable.

Detailed, comparative cost calculation are to be initiated to confirm the benefits of the alternatve supply systems.

5.2 Pulp Mill

Status

For description of the pulp mill see Annex A-2.

- Woodyard:

Generally, the wood as supplied by the forestry department comes in 2,40 m long logs and in a diameter range that suit the woodhandling equipment.

Due to the low production (about 38% of rated production in 1990 and less than 25% rated in the first 7 months of 1991, with the correspondingly low wood consumption, causes an accumulation of over-mature and over-sized wood in the plantations. Before it can pass the chippers, over-sized wood is reduced in size with chainsaws, a rather wasteful method. It is also expected that younger wood gives better pulping results.

The woodyard equipment in general appears to be in a reasonable condition with the exception of the long chain conveyor for logs which is now badly worn and needs a replacement chain.

Chipper knives and grinding stones for the same are in short supply and need re-stocking when full production is envisaged. No debarking is foreseen. Most of the bark is separated during chipping and separated on the chip screens. The remaining bark has apparently no ill effect on the pulp quality.

- Pulp mill:

The equipment appears to be in good condition. The installation makes a very good impression. There are a few mechanical defects of a minor nature which can be solved once the required spare parts become available.

Production is limited by the consumption of the paper mill to around 40% of rated overall capacity. This is mainly due to lack of long fiber pulp or lack of fuel oil and not due to constraints in the pulp mill. For the analyzed period between Jan 1.1990 and July 31.1991, the pulp mill supplied normally only one paper machine.

In a limited but significant number of instances, when two paper machines were operating simultaneously, the pulp mill could keep up the supply of Gmelina pulp, thereby proving its basic ability for full production.

During the scheduled operating time (approx. 75% of available time in 1990 and approx. 50% in the first 7 months of 1991), the average production efficiency amounted to slightly less than 90%.

The lost time was caused mainly by minor mechanical and electrical problems.

- Quality aspects:

The pulp quality now reached allows the production at good rates of acceptable newsprint with addition of no more than about 18% long fiber pulp. One less desirable property is the relatively high bulk, probably inherent to the Gmelina fiber.

Recommendation Woodyard

On a short term basis, banal deficiencies like a worn-out log conveyor chain, a defective coupling or missing grinding stones for chipper knives need immediate attention in the form of a normally and expeditiously functioning spare part procurement system.

Depending on the inventory of oversized logs it may be advisable to install a second hand bandsaw rig for reducing the log sizes, replacing the inefficient chainsaw operation.

Recommendation Pulp Mill

After elimination of the spare part backlog no short-term equipment alterations seem required, neither from the point of view of production capacity nor regarding pulp quality. An exception may be the replacement of a few obsolete control instruments and the rehabilitation of the level indicator for the impregnation vessel.

Other short-term constraints, if any, to reach full integrated production on a continuous basis can only be analyzed and eliminated if the supply of fuel oil, long fiber pulp for the paper machines, spare parts and consumables allows the management to run the pulp mill at full capacity for extended periods of time without undue interference.

The results reached so far do not induce doubts that such a condition could, technically, not be reached. After establishing such operating conditions, further optimizing programs regarding the pulp quality, chemical, water and power savings etc. should be undertaken.

Normalized production rates will result in a reduction of the overmature wood inventory and allow the mill management to study the influence of the age of wood on yield, quality, power and chemical consumption, in order to optimize the combined operation of mill and woodlands.

A particular subject of optimization is the bulk of Gmelina pulp. The influence, if any, of chemical and refining parameters should be determined.

Particular factors under study should be, amongst others, refiner plate patterns, impregnation parameters, bleaching parameters. Since the design of this CMP line, now more than 12 years ago, considerable technical development has taken place in the high-yield pulping field and a close contact with Sunds-Defibrator the supplier of this plant and one of the leaders in this technology is strongly recommended.

The long-term outlook for the pulp mill will depend on the future demands of the paper mill and possibly on the future availability of long-fiber wood as fibrous raw material. This would require major modifications in the pulp mill equipment.

5.3 Paper Mill

Status

A description of the paper mill and its main equipment can be found in Annex A-2 and the mill operation details are contained in Annex A-5.

All paper mill equipment appears to be in a good condition. Both machines with their auxiliaries are operational.

Due to the permanent shortage of fuel oil or long fiber pulp, the machines are operated in turns. In the period from Jan 1.1990 until July 31.1991 paper machine I has been scheduled to run for about 25% of the available time, paper machine II for about 50%. During operation a running efficiency of about 85% is reached and the capacity utilisation per machine is around 80% of rated capacity. An analysis of monthly production efficiency is given in Annex A-5.2.

The furnish is 82% Gmelina chemo-mechanical fiber and 18% bleached or semibleached long fiber kraft pulp. A rough fiber balance of the paper mill indicates very high fiber losses (close to 20%), probably due to extremely high specific water consumption (and corresponding waste water emission) and other factors.

In a few but significant number of cases both machines have been operating simultaneously, thereby proving the basic ability of the mill of reaching full rated production once the preconditions, repeatedly mentioned before, are fulfilled.

As far as quality aspects are concerned and as already mentioned, certain drawbacks affecting the market acceptance compared with imported newsprint exist: the relatively high bulk and the relatively low smoothness of the paper produced. These may be, at least partly, due to the characteristics of the Gmelina fiber but also the sheet-making technique may have an influence.

The relatively low brightness does not appear to be a technical problem. The mill management minimizes the use of peroxide for bleaching for economical reasons.

Recommendations

As soon as possible and as mentioned under 5.2 already the preconditions should be established to operate both machines at rated capacity on a continuous basis.

This means, amongst others, an adequate supply of long fibered pulp. From the operating experience obtained so far there is no doubt that this condition can then be reached within reasonable time.

In the meantime, serious efforts must be made to reduce the excessive fiber losses, in the first place by means of reducing the fresh water consumption and furthermore by enhancing the loss-consciousness of the personnel. (see also 5.5.7)

On a short-term basis and regarding the production capacity of the machines, there seems little or no need for equipment alterations, not mentioning the need to eliminate the backlog on spares and consumable orders. One exception could be made for a modification of the existing dryer fabric runs into single felt serpentine runs, provided that, for the present dryer configuration, that any advantage of better runnability is not annihilated by a loss in dryer capacity. Another exception is the improvement of the web tension control on the rewinder for reducing the number of breaks per roll of product and alleviating customers complaints.

Concerning quality aspects, on short to medium term the problems of high bulk and low smoothness should be tackled in order to improve the market acceptance, particularly in view of future export.

This probably typical characteristic of Gmelina pulp was, presumably, not sufficiently known during the design phase of the mill so that no particular measures have been taken for compacting the sheet other than the conventional calender stack. The relatively high bulk coincides with a rather low smoothness and the present mill management's hypothesis that a top wire could improve smoothness and reduce bulk at the stage of sheet formation may be valid. In how far soft calendering reduces bulk remains to be seen but it can be expected that smoothness develops better than in the conventional stack which, when run with all nips, destroys the somewhat soft sheet. Both proposals top wire and soft calander, which require considerable capital investment, should be studied with prospective suppliers by means of pilot plants or reduced mill scale tests for their effect.

Also, both machines should be equipped with an line moisture and basisweight profile monitoring equipment to replace the existing obsolete instruments which, for various reasons, could never be commissioned.

Furthermore, some modifications on the dryer condensate system may be required.

Long term aspects:

The paper machines have been constructed in 1975 and reflect the level of technology of that era. Under more normal conditions these machines would have been modernized, making use of various developments. The machines have a potential for increasing their capacity without enlarging the dryer sections.

Provided that the short term measures are successful and the market acceptance both domestic and for export is adequate so that capacity is likely to become a bottleneck, adequate steps may be envisaged to increase the capacity of the paper machines. Steps to this end would probably include the headbox and head circuit, suction foils, the press section, possibly the drive section (adding a top wire, mentioned earlier, is also a major factor for capacity increase). The next natural barrier will then be the pulp mill capacity which cannot be enlarged by relatively simple means. However, at this time such considerations are premature.

5.4 Power Plant

Status

For a description of the power plant and the equipment installed see Annex A-2.

For the generation of power and process steam the NMMC mill is self-supporting. However, the power plant depends on regular supply of LPFO (low pour fuel oil). This supply is not guaranteed due to financial problems and, occasionally, delivery problems at the refineries and then the operation of the power plant is seriously affected. The fuel storage capacity allows max. 14 days interruption of supply at rated mill capacity.

The heat recuperation from the pulp mill refiners is limited to pressure less vapour condensation for preparing hot process water only.

The power plant equipment generally appears to be in a well kept condition. In a few instances when the pulp mill and both paper machines were in operation for a number of days, the power plant could prove its ability to supply the required power and steam.

There are a few minor defects requiring spare parts. Of importance is also a recurring defect in the drive system of the fans in the main cooling tower for turbine condensor cooling water. This is at present a serious constraint for the power generation.

Generally, the operation of the power plant is expected to be safe and secured when both conditions, the
- availibility of spare parts and consumables and
- regular supply of fuel oil

are met.

Recommendations

As an immediate action, the regular fuel oil supply must be secured.

The cooling tower fan drive problem should be analyzed and solved with high priority.

The general spare part situation should be normalized and the backlog of critical spare parts on order eliminated, so that all equipment can be properly maintained.

On a medium term basis, the economy of piping gas (natural or from refineries) to the mill site should be studied in detail. From technical and environmental points of view the use of this gas which is now flared-off at the refineries is attractive. The uninterupted supply of this gas must be confirmed.

Furthermore, considerable quantities of wood wastes such as bark, fines, cut-off pieces of logs, screen rejects etc. and mud from the primary effluent clarifier will lead to disposal problems.

It is recommend to contemplate burning of these materials and to generate steam this way, thus improving the heat economy of the mill.

5.5 Effluent

Status

A description of the effluent treatment facilities is shown in Annex A-2 and typical effluent characteristics for the period are shown in Annex A-7.

The present effluent flows are far too high in relation to the production level, due to excessive fresh water consumption in the mill, as outlined above.

The figures for COD are low but this is mainly due to the excessive dilution.

The suspended solids, mainly fiber, are high and indicate considerable fiber losses. This is no doubt also caused by excessive water consumption and, probably, uncontrolled overflows and spills.

The results are financial losses for the mill and undue sludge disposal problems. The present primitive arrangement with two sludge drainage ponds requires periodical cleanout and sludge disposal, a rather unpractical method.

The COD reduction in the aerated pond is, for the time being, acceptable and requires no attention until the environmental legislation would pose stricter limits.

Recommendations

On short terms, by internal measures in the pulp mill and the paper mill in particular, the effluent flow must be drastically reduced. The fiber loss problem must be systematically tackled.

On medium terms, the sludge from the effluent clarifier should be dewatered on a continuously operating unit like twin wire press or the like, so that the sludge disposal can be properly organized on a regular basis.

In case sludge deposition is a problem, incineration, along with other organic waste (woodyard) could be a solution in future. The steam generated by such a waste wood and sludge boiler would contribute to the overall steam supply to the mill.

5.6 Instruments and Controls

The instrumentation is based on pneumatic technology of the 70's. Certain components are already obsolete and need replacement on a short term basis. The replacement should be compatible with the existing system but should not prevent the eventual development of a computerized distributed control system on a long-term basis. For this purpose a suitable concept for development should be developed.

6. STAFF AND STAFF DEVELOPMENT

6.1 Manpower Situation

The workforce of the Nigerian Newsprint Company totalled 1781 employees at 31st July 1991. A break down is provided in Annex A-9.

6.2 Staff Development and Training Facilities

6.2.1 Staff Development

(1) In-plant Training

The NNMC staff development is organized by the manpower development and training department, which operates under the human resource division. The division's employment totalled 188 in June 1991 with only two trainers and one executive officer working with the training department (for further details refer to Annex A-9.

In 1990 a total of 532 members of staff or about 30% of the current workforce attended training courses organized by the paper mill. Out of this the majority of more than 80% were junior staff members. A breakdown of the 1990 training by departments and main subjects is provided in Annex A-9.

The main bottleneck in satisfying the mill's training needs is related to budgetary constraints. This explains also the understaffing of the training department and the lack of equipment.

(2) Cooperation with other Institutions

The training offered to NNMC personnel includes outdoor courses organized by:

- the University of Lagos
- the University of Ibadan
- the Nigerian Institute of Management
- the Center for Management and Administrative Courses
- the Institute of Personnel Management
- the Nigerian Society of Engineering
- the Institute of Chartered Accounts of Nigeria
- Peat Marwick
- Volkswagen of Nigeria
- Peugeot Automobile of Nigeria

6.2.2 Training Facilities

The training section of the Nigerian Newsprint Company is quite well equipped, comprising the following outfit:

- two class rooms for 20 persons each furnished with a magi board
- audiovisual equipment, such as 16 mm film, slide and overhead projector
- teaching materials
  - o instruction manuals covering most of the operational areas of the mill including maintenance
  - o text books
  - o transparency folios
  - o films on industrial safety and forestry operations

In addition there exists also a small mechanical workshop and a machine shop. The machine shop is equipped with 2 lathe, 1 shaper, 1 milling machine, 1 drilling machine, 1 arc welding machine and 1 grinding machine.

6.3 Recommendations

The improvement of staff development calls for the following measures:

- employment of five to six trainers with experience in the following areas:
  - o controlling
  - o production management and supervision
  - o paper production technics
  - o electrical works
  - o instrumentation
  - o air conditioning and refrigeration
- additional training facilities such as video set including camera, for instance to film certain process steps, video tapes and an electrical instrumentation workshop.

7. COST ESTIMATES

The cost estimates are first, overall budget figures which have been developed from the following sources:

- World Bank Industrial Sector Mission (June '89, Mr. G.C. von Dosselaere)
- Equipment manufacturers budgets
- NNMC's cost estimates for replacement and spare parts
- HRAG's file data and information available from other projects.

They are subdivided according to HRAG's judgements concerning

- short term (immediate) requirements,
- Medium term (may also be considered "long term", as
- (really) long term investments, can be estimated after the immediate and medium term investments show their results.

Out of the budget cost estimates given under 7.1 below, the really urgently "short term" investment costs, by HRAG's judgement, are US$ 1'300'000,-. This does not include forestry and woodyard equipment.

NNMC has established own estimates which go beyond the most urgent minimum as established by HRAG.

The NNMC figure for new, or replacement machinery and equipment totals to US$ 6'800'000,-. This figure has been used in the discussions of the financial aspects of the enterprise, further down.

7.1 Equipment Alterations

(Order-of-magnitude estimates)

	US $, installed
1. Forestry equipment - short term - long term	not considered due to future contractor logging
2. Woodyard equipment - short term - long term	(repair only)
3. Pulp mill - short term Instrument modifications, etc., see 6) - long term	
4. Paper mill 4.1 short term: Dryer fabric run modification Winder modifications Condensate system mod's Measuring and control systems 4.2 medium term: Top wire arrangement Soft calender 4.3 long term: (can only be developed after 4.1 and 4.2 are in place)	 150'000 350'000 150'000 350'000 5'000'000 9'500'000
5. Utilities - short term: Increase oil storage - medium term: Boiler conversion to natural gas Piping, pressure reducing and measuring station Sludge dewatering press Refuse incineration plant	 100'000 200'000 (?) 500'000 1'000'000

7.2 Spares

Practically all spares are to be imported.

NNMC is, obviously, aware of the critical spare parts situation. The mill keeps records over the demand and actual supply.

4 priority stages for spare parts requirements have been established, together with the respective Naira values. (See also Annex A-6.)

The requirements are:

Priority	0: N 6'668.852,-	=	US$ 588'601,-
Priority	1: N 4'049.143,-	=	US$ 357'382,-
Priority	2: N 5'245.597,-	=	US$ 462'983,-
Priority	3: N 5'086.615,-	=	US$ 448'951,-

The total of slightly over N 21.0 Mio is actually the amount required to replenish the spares and consumables stock at the mill, to provide the basis for normal mill maintenance.

8. FINANCIAL ASPECTS

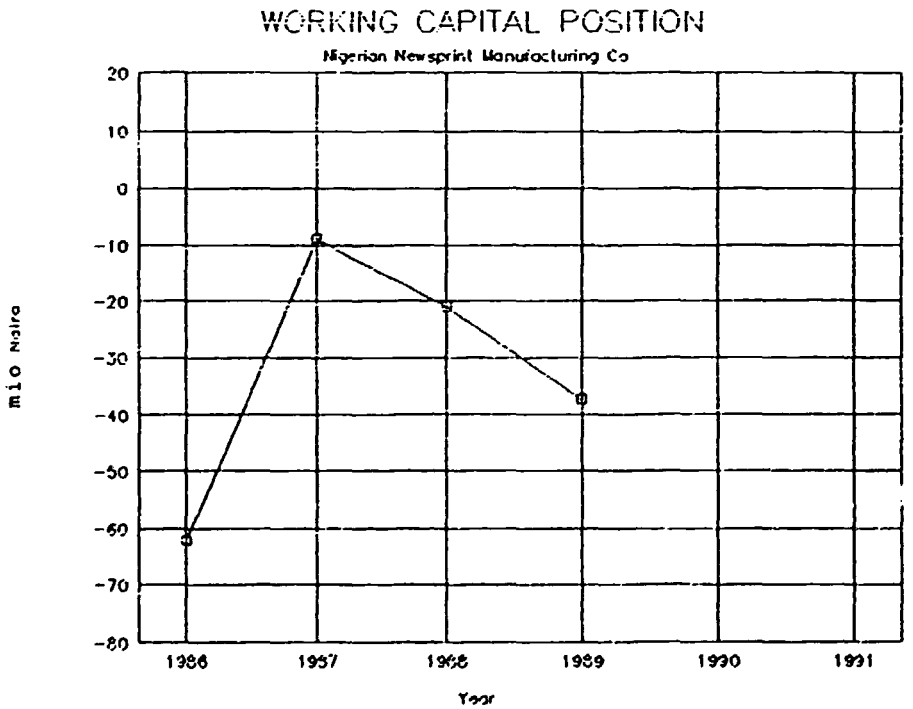
8.1 Financial Status and Performance

The prime data source for this review were the audited financial statements of the company for the period from 1986 to 1989. The draft accounts for 1990 could not be taken into account, because they had to be considered inadequately substantiated.

The working capital position of the paper mill has been completely inadequate since the commissioning of the plant. No adequate funds were provided to cover the initial cash requirements to build up inventory levels and finance debtor balances for reaching a profitable production / sales volume. Accumulated losses contributed further to a widening of this gap.

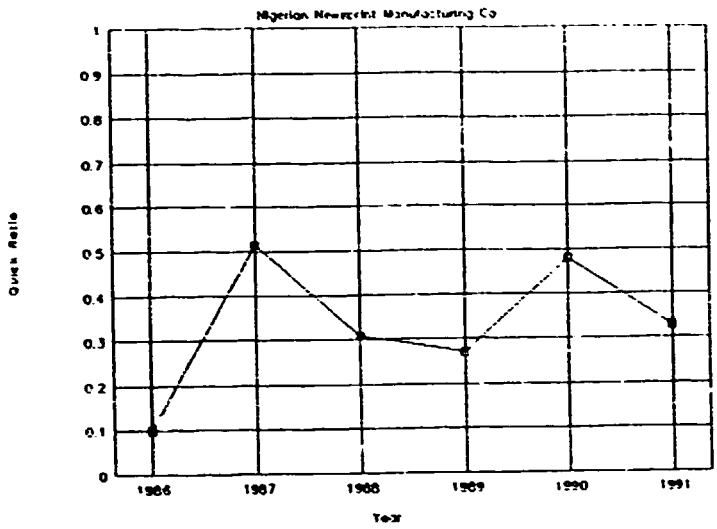
The following graph illustrates the deteriorating working capital situation from 1986 to 1989. The current situation (1990 and 1991) is not shown due the to lack of reliable data. Figure 8.1-2. shows the development of the quick ratio[1] over the period. It confirms the insufficient liquidity of the mill.

Figure 8.1-1: Working Capital Position of NNMC



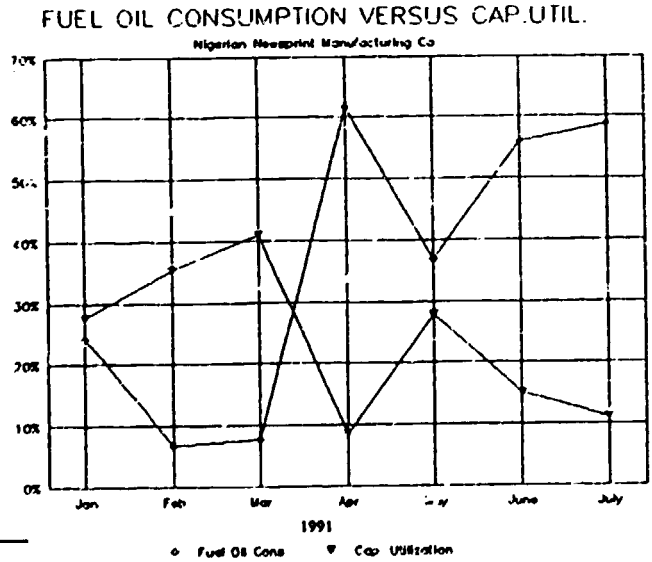
1 The quick or acid test ratio was developed to show the company's ability to pay current obligations out of cash and debtors. The calculation is based on the following formula:
Quick Ratio =(Cash+Debtors)/Current Liabilities

Figure 8.1-2: Analysis of the Liquidity of NNMC for Period from 1986 to 1991



As a result of the poor working capital situation the paper mill hardly operated above break even level: during the first half of 1991 capacity utilization fluctuated between 9% and 41%. This low production level again severely affected the efficiency of the plant. The graph below indicates the linkage between capacity utilization and fuel oil consumption. It confirms a high variation of the actual consumption from the standard rate if the capacity utilization is low. In July for instance capacity utilization dropped to about 10% while actual fuel oil consumption exceeded the standard rate [2] by almost 60%. This again has a direct impact on the financial performance of the mill.

Figure 8.1-3: Variation of Fuel Oil Consumption Versus Capacity Utilization



2 1.5 ton fuel oil per fmt paper

8.2 Projected Requirements

8.2.1 Method of Approach and Main Assumptions

The assessment of the financial requirements of NNMC covers the period from 1991 to 1998. It is assumed that the domestic paper market can absorb the annual production of 80,000 tons of newsprint and mechanical printing. The analysis is further based on 335 working days per annum and three shifts operation. The relevant data for computing the financial analysis are contained in Annex A-8.2-1.

8.2.2 Investment Costs and Financing Plan

The investment and financing plan is provided in table 8.2.-1. It considers the capital costs and the net working capital requirements. NNMC estimated their capital costs at US $ 7.2 mio.

The additional working capital to reach the planned production level has been estimated at approx. US $ 15.8 mio. This takes into account the inventories recorded at 31. July 1991.

Total investment costs accordingly amount to about US $ 23 mio. The tentative financing plan assumes a state capital injection of Naira 200 mio and loan financing of Naira 50 mio at 15% interest rate.

Table 8.2-1: Investment and Financing Plan in 1000 US $

Table : INVESTMENT AND FINANCING PLAN IN 1000 US$
Client: Nigerian Newsprint Manufacturing Company Ltd

INVESTMENT	1991	1992	1993	1994
Pre-operational Expenses				
Engineering Consultancy	0	0	0	0
Management Consultancy	0	0	0	0
Training	0	0	0	0
Pre-operational Expenses	0	0	0	0
Fixed Investment				
Buildings and Civil Works	0	0	0	0
Machinery and Equipment	6,800	0	0	0
Furniture & Office Equipment	412	0	0	0
Vehicles	0	0	0	0
Machine Tools	0	0	0	0
Fixed Investment	7,213	0	0	0
WORKING CAPITAL REQUIREMENTS				
1.1 Gross Working Capital Requirements				
Material in Stock	11,628	136	539	565
Finished Goods Stock	3,778	1,804	197	276
Work in Process Stock	1,099	29	31	55
Trade Debtors	0	0	0	0
Trade Creditors	0	0	0	0
Cash Requirements	1,223	61	64	68
Gross Working Capital Requirements	17,728	2,031	832	964
1.2 Working Capital Available at 31. July 1991				
Material in Stock	1,910	0	0	0
Finished Goods Stock	52	0	0	0
Work in Process Stock	0	0	0	0
Trade Debtors	0	0	0	0
Trade Creditors	0	0	0	0
Cash Requirements	0	0	0	0
Total W/C Availabel at 31. July 1991	1,962	0	0	0
1.3 Net Working Capital Requirements				
Material in Stock	9,718	136	539	565
Finished Goods Stock	3,727	1,804	197	276
Work in Process Stock	1,099	29	31	55
Trade Debtors	0	0	0	0
Trade Creditors	0	0	0	0
Cash Requirements	1,223	61	64	68
Net Working Capital Requirements	15,767	2,031	832	964
Total Investment	22,980	2,031	832	964
FINANCING				
State Capital	17,652	0	0	0
Loan Financing	4,413	0	0	0
TOTAL FINANCING	22,065	0	0	0

8.2.3 Projected Cash Flow for Financial Planning

The cash flow projection is made in nominal terms. They have been computed by applying the average price escalation rates which have been established from past price developments. For details refer to the input data in Annex A-8.2-1.

If the cash flow projects a deficit, it is financed by overdraft facilities at 31% interest rate. The utilization of these facilities is reduced in line with the improved financial performance.

Table 8.2-2 provides the detailed cash flow. It is a first estimate, since some rates and data still have to be confirmed by the mill. The projection indicates a positive impact of the paper mill, if the envisaged sales volume can be realized. However, servicing of the major share of the loan outstanding at 31.12.1991 has not been considered, since terms and conditions had not been established by August 1991. But the present cash flow demonstrates a limited capacity to absorb any additional financial burden. If, however, the 1991 paper prices are raised, as proposed by the NNMC management, this could considerably improve the financial picture.

8.3 Financial Internal Rate of Return

The calculation of the financial internal rate of return requires to establish the current market / replacement value of the plant since the book value cannot be applied. This assessment, however, is difficult for technical and commercial reasons. It requires an in-depth investigation and valuation. If for instance 50 % of the reported book-value of August 1991 is applied the FIRR in real terms amounts to about 12 %.

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Table 8.2-2: Cash Flow for Financial Planning in 1000 US

Table : CASH FLOW FOR FINANCIAL PLANNING IN 1000 US$ --> APPROXIMATION

Client: Nigerian Newsprint Manufacturing Company Ltd

Item	1991	1992	1993	1994	1995	1996	1997	1998
Cash Inflow								
From Equity and Loan								
State Capital	17,652	0	0	0	0	0	0	0
New Loan	4,413	0	0	0	0	0	0	0
Subtotal	22,065	0	0	0	0	0	0	0
From Operations								
Sales Revenues Current Prod.	44,649	52,742	55,379	58,148	61,055	64,108	67,314	70,679
Other Income	0	0	0	0	0	0	0	0
Subtotal	44,649	52,742	55,379	58,148	61,055	64,108	67,314	70,679
Total Cash Inflow	66,715	52,742	55,379	58,148	61,055	64,108	67,314	70,679
Cash Outflow								
Investment								
Pre-operational Expenses	0	0	0	0	0	0	0	0
Fixed Investment	7,213	0	0	0	0	0	0	0
Working Capital Built-up	10,942	197	603	633	663	694	726	761
Subtotal	18,155	197	603	633	663	694	726	761
Operations								
Materials	24,866	25,197	25,553	26,720	27,941	29,219	30,555	31,953
Salaries and Wages (incl.uniforms)	1,023	1,048	1,073	1,099	1,125	1,152	1,180	1,208
Repair and Maintenance(incl.lubricants)	3,364	3,532	3,710	3,896	4,091	4,296	4,512	4,738
Consumables (felts,wires,refiner plates)	3,015	3,166	3,324	3,490	3,665	3,848	4,040	4,242
Other Operational Costs	7,159	7,537	7,936	8,374	8,836	9,323	9,837	10,380
Subtotal	39,426	40,479	41,595	43,579	45,658	47,838	50,124	52,522
Overheads (excl. debt service)								
Administration	1,804	1,887	1,975	2,067	2,164	2,265	2,372	2,485
Selling & Distribution	337	351	365	380	396	412	430	448
Other Overheads	32	34	36	38	40	42	44	47
Subtotal	2,173	2,272	2,376	2,485	2,599	2,720	2,846	2,979
Cash Outflow (excl.debt service)	59,754	42,948	44,575	46,697	48,920	51,252	53,697	56,262
Net Cash Flow	6,961	9,794	10,804	11,451	12,135	12,857	13,616	14,417
Cash Flow from Operations	(7,892)	9,794	10,804	11,451	12,135	12,857	13,616	14,417
Debt Service								
Interest on Bank O/D	0	0	0	0	0	0	0	0
Interest on Old Loan (*)	1,412	1,412	1,412	1,412	1,412	1,412	1,412	1,412
Interest on New Loan (*)	3,750	7,500	7,500	7,342	7,161	6,953	6,713	6,437
Repayment of Old Loan (*)	0	0	0	0	0	0	0	0
Repayment of New Loan (*)	0	0	1,051	1,208	1,390	1,598	1,838	2,114
Subtotal	5,162	8,912	9,963	9,963	9,963	9,963	9,963	9,963
Net Cash Flow After Debt Service	1,798	881	841	1,488	2,172	2,893	3,653	4,454
Payment of Government Debts								
Taxes Payable	0	0	0	0	0	16	561	1,162
Others	0	0	0	0	0	0	0	0
Subtotal	0	0	0	0	0	16	561	1,162
Net Cash Flow after Debt Payment	1,798	881	841	1,488	2,172	2,877	3,092	3,292
Accumulated Cash Flow	1,798	2,680	3,520	5,009	7,181	10,058	13,151	16,443
(*) to be confirmed								
Flow After Debt Services / Sales Revenues	4.0%	1.7%	1.5%	2.6%	3.6%	4.5%	5.4%	6.3%

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A N N E X E S

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Annex A-1

TERMS OF REFERENCE FOR A CONTRACT FOR HIGH LEVEL ADVISORY SERIVCES IN THE REACTIVATION OF THE NIGERIAN NEWSPRINT MANUFACTURING COMPANY AT OKO-IBOKU

US/NIR/90/136

Introduction

The pulp and paper industry in Nigeria is relatively young and the first pulp mill became operational in 1969 at 14.000 mt per year and was expanded to 65.000 in 1985. The second mill with a rated capacity of 100.000 mt/year was commissioned in 1986. This was established at Oko-Iboku (cross River State) and belonged to the Nigerian Newsprint Manufacturing Company (NNMC).

Apart from the technical problems faced by the pulp and paper manufacturing plants, considerable problems stem from the type of wood available. The three paper mills in Nigeria are designed to use hardwood as the basic raw material. There are, however, no plantations of suitable species, and of adequate size, in the economic distance of the mills. Therefore, mixed hardwoods (14 species) are being used by one mill and Gmelina arborea pulp supplemented by expensive imports of long-fibre pulp is being processed in the other mill. The use of mixed hardwood of local origin does not assure obtaining the desired high quality pulp for downstream manufacture of finished paper products.

The Nigerian Newsprint Manufacturing company employs two paper machines and one Chemi-Thermomechanical Pulping (CTMP) plant of 100,000 mtpy capacity in terms of newsprint. The plant is pulping Gmelina wood.

As indicated by a UNIDO mission to Nigeria in 1989 there appears to be an obvious need for assistance in solving a variety of technical problems, such as:

(1) lowering the dependency on imported long fibre pulps through searching for local resources of similar fibres;

(2) improving the safety programme of the mill;

(3) provision of continous training and up-grading of qualifications of staff and operators of all levels of proficiencies.

However, this project concentrates on solving problems of presently highest priority, as an emergency programme.

There is an evident danger of shut-down of all operations of the mill unless pressing maintenance problems of the pulping plant, the paper machine and tuilities units are solved. Some advice on the mechincal hardwood pulping machinery and operations are also needed in this connection, so as to revitalize all sections of the mill towards assuring long-term continuity of the entire production. The need for assistance on forestry related subjects is also of long-term nature. It needs to be based, however, on measures to be taken immediately, and hence, the Company's request for assistance in this respect fits well into the complexity of solving continuity problems of operations of the paper mill.

Although there is no recent reliable statistics on production and importation available, covering the years 1985-1989 it may be mentioned only that there has been a market for 70,000 mtpy newsprint (imports) in 1984 and 1985. Supplies from production and imports are said to have reached 23,000 plus 17,000 in 1986, and 25,000 plus 15,000 mtpy in 1987, respectively.

Contractors Responsibility

The main task to be completed by the contractor will be to make a critical assessment of the status of the mill and provide advisory services as to how the plant could be revitalized to cut down costs and make the operation of the mill economically more viable.

Such advisory services should take into account short-term and long-term measures that are needed in terms of:

- raw materials supply
- lowering dependency on imported long fibre pulp through local resources.

- increased occupational capacity

- removing bottle necks in overall production programme including replacement of equipment and change of design,

- reorganization of personnel requirements and improve operational safety,

- effluent control measures,

- energy management,

- the likely cost in local and foreign currency to revitalize the mill to make it a viable plant,

Based on the studies the contractor should prepare a diagnostic survey report recommending different alternatives with specific action that should be considered by the management of the NNMC.

Services of the contractor

The contractor's team would consist of at least 3 specialists consisting of

- an industrial engineer in the operation of a paper mill (team leader)

- specialist in services needed to paper industry (raw materials, chemicals, etc.)

- Economist/financial analyst.

A total of 2 weeks in Nigeria to carry out the field study and 2 weeks at home base to complete the analyses and prepare the draft report are required. The team leader would visit Vienna to discuss draft report.

The team leader of the contractor will visit UNIDO as follows:

- initial briefing - within one week from the date of the award of the contract.

- debriefing - on completion of the field and home base work to discuss the draft report.

Report

The contractor should submit 20 copies (in English) of his final report to UNIDO.

Project Responsivility

The contractors will be provided:

- Access to the existing manufacturing facilities of the pulp and paper mill, inclusive of off-site (utility) units;
- Access to the existing hardwood plantation and other sources of raw materials supply;
- Access to the engineering design (drawings) of the existing plant machinery and equipment;
- Technical data on plant performance, reports on causes of shut-downs, and emergency situations caused by equipment failure;
- Technological (process) data on pulping and paper making, with indications of problem areas for consideration by the consulting company;
- Support services and facilities normally required in connection with missions of UNIDO sub-contractors' personnel, UNIDO staff or short-term consultants/experts in the field (Nigeria), compromising but not limited to:
  - office accomodation, furniture and standard equipment;
  - access to communication equipment (telephone, telex, telefax);
  - general supporting and maintenance services;
  - transportation facilities for transfer of the consultants on arrival and departure and daily communication between the airport and hotel/residence and/or office respectively, as necessary.

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Annex A-2

MILL DESCRIPTION

GENERAL

Type:	Integrated Pulp and Paper Mill
Designed Production Capacity:	100,000 MT/year
Newsprint Furnisn:	Chemi-mechanical Pulp (CMP)-80%
	(from Gmelina Arborea)
	Imported Bleached Kraft Pulp - 20%
Electricity:	Integral generating plant
	System Voltage 11KV, 3Ø, 50Hz
	Supply to motors (a) 11KV, 3Ø, 50Hz
	(b) 3.3KV, 3Ø, 50Hz
	(c) 400V 3Ø, 50Hz
	Control supply: 230/110V, 1Ø, 2 wire.
Steam:	62 bar gauge, 482 °C
	12 bar gauge, 195°C
	3.5 bar gauge, 150°C
Compressed Air:	Mill: 7 bar gauge, oil free
	Instrumentation: 7 bar gauge, oil free, dried to dew-point-30°C.
Water Supply pressure:	3 bar gauge.

MAJOR DEPARTMENTS

1. WATER SUPPLY AND TREATMENT (21)

Raw Water Pumps: 4 Worthington-Simpson four-stage Vertical Pumps (3 duty, 1 standby, capacity 550m^3/h each).

Treatment: By clarification and filtration.

Chemicals used: Aluminium Sulphate, hydrated lime and Polyelectrolyte.

Treated Water Pumps: Same as above but 3 stage, 530m^3/h.

Treated Water Reservoir: 7500m^3 capacity

2. EFFLUENT TREATMENT (22):

Treatment: By primary clarification and mechanical aeration. Designed to treat maximum effluent flow of 1320m³/ hours at solids content of 1250mg/1. Clarified Sludge is removed by (a) scrappers fitted to rake arm structure (driven) (b) Sludge Pumps for the centre cone to sludge lagoon (2No., 15000m³ each). Clarified water decants to the aeration lagoon provided with 12 mechanical surface aerators (75kW each) floating on fibre glass reinforced polyester resin pontoons. Treated effluent is discharged to the river. Concentrated sludge is removed from sludge lagoon by mobile equipment.

3. FIRE PROTECTION (23): Two systems are provided.

(a) Hydrant ring main (10 bar pre-set Pressure) around the mill with outlets at strategic points. In the event of falling pressure, a combination diesel/electric driven pump comes on automatically.

(b) Sprinkler system for the Finished Products and Purchased Pulp warehouses & Paper machine hood.

4. WORDYARD (31)

Wood storage area 50000m² for 88000MT of logs. Logs supplied in 2.4m lengths, and fed by Crawler Cranes & Pettibone cary-lift with clam attachments to the chippers (2No-Carthage, eight knife, 375rpm) via the yard conveyor (chain type), wash conveyor (roller type), drainage conveyor, speed-up conveyor and chipper feed conveyor.

Chips are blown to cyclones for seperation from air stream to chip distribution conveyor and then to chip surge hoppers. Rotary feeders distribute chips for screening into usable, fines or over-size. Accepted chips are blown to the chip silo (capacity 4000m^3), while oversized chips go to the re-chipper.

A shuttle conveyor distributes chips into the two silo components equiped with travelling parascrews for dicharge of chips to the Pulpmill - via the silo discharge conveyor, silo collecting conveyor, elevating conveyor and pulp-mill conveyor.

5. PULP MILL (45): Chips arriving from the feed conveyor pass through a scrap seperator, chip washer into the chip steaming vesel (capacity 20m^3) fed with low pressure steam at 3.5 bar.

Steamed chips are discharged by means of a vibrating discharger to the screw feeder. The chips are compressed by means of a plug to remove excess air and water before discharge to the Impregnator vessel to absorb the impregnating liquor (NaoH + NaS Feed to the impregnator is at the bottom by means of a vertical lift Screw. Retention time is approximately 40 mins.

After impregnation chips are transferred by a screw conveyor to the Buffer vessel (20m^3 capacity). There is provision to by-pass the Buffer vessel.

Chips are discharged by means of a vibrating feeder into the Screw press where excess liquid is removed by compression, and discharged to the refining stages.

Three refining stages are provided; primary, secondary and tertiary. (Refiners are 5No. Defibrator RL(P)54/S single disc type driven by 6.5mW, 11KV, 1500rpm water cooled sychronous motors). The 1st and 2nd stages comprise 2 refiners each while the 3rd stage has 1 refiner.

Chips are introduced into the refiners under pressure applied by the feedscrew and refined by centrifugal forces pulling the chips to the periphery between the stationary and the rotating disc carrying replaceable refining segments. Dilution water is added during the refining process and at discharge. Consistency of 1st stage refining is about 25%. Discharge from the 1st stage goes to the Primary Refined stock chest (storage at about 4% consistency). From the first stage, the stock is diluted/pumped at 1% consistency to the Primary washer (Hedemora 3m diameter, 6m length type). The wire cloth covered washer drum rotates in a Vat containing the pulp slurry with the lower section submerged in the slurry.

By means of vacuum application; pulp sheet adheres to the submerged portion as the drum rotates.

Filtrate drains by means of differential pressure between atmosphere and vacuum within the drum. Showers are located over the pulp sheet to wash off the liquor as the drum rotates. Finally vacuum is cut off and washed pulp is removed by means of air doctor just before cycle is repeated.

Discharged pulp at 17% consistency is pumped by thick stock (high density) pump to the secondary refining stage.

Washer filtrate is accumulated in the filtrate tank and recycled/utilized at various points in the pulping process.

The 17% consistency stock is pumped to a screw conveyor which feeds the 2nd stage refiner's via their screw feeders.

At entry to tne refiner, peroxide bleaching solution is added to improve the brightness of the pulp.

Discharged pulp from this stage is pumped at 15% consistency to the Bleach Tower (200m^3 capacity, 30 ton) with retention time of 3 hours.

From the bleach tower the pulp is diluted and pumped at 3% consistency to the latency (curl) removal chest (145m^3) equipped with agitators. Retention time is 25 mins.

From the latency chest the pulp should be pumped to the Selectifier Screen (now by-passed) for the seperation of coarse fibre material from acceptable fibre. Diluted pulp now goes (at 0.65% consistency) to the primary cleaners.

Clean accepts at 0.5% consistency go to the deckers (Thickeners).

Rejects of the 1st stage cleaners is diluted to 0.6% consistency with decker filtrate and pumped to the secondary cleaners.

Accepts of this stage are recycled to the Selectifier Screen accepts chest (connected by a weir to decker filtrate chest) and rejects are diluted to 0.6% consistency and pumped to the tertiary cleaners for final cleaning. Accepts from this stage return to the primary refined stock chest while rejects are discharged to the sewer.

Cleanersare type "Cleanpac 300" with 144 (model 2H-36) provided for the primary stage, 48 of model 2H-24 for the second stage and 12 of model 1HRC for the 3rd stage.

Stock enters the cleaners at the top tangentially under pressure. Accepts exit at the top while rejects are removed at the bottom of the cleaners. Sand and other impurities are removed by the high tangential entry velocity of the stock and the pressure drop between the inlet and outlet headers in the different stages of the system.

As the liquid spirals downwards, heavy impurities travel to the wall of the cleaner while a liquid-free core exists at the central axis of the cleaner. By this vortex action, floating fibres are seperated from impurities.

Accepts of the primary cleaner stage is thickened from 0.5% consistency to 16% consistency by means of the Deckers (Thickeners-of same construction as the Primary washers, 3.5m diameter, 7.5m length and 82.5m² area) by vacuum.

The thick stock is pumped by the high density pump to the feed conveyor of the tertiary refining stage.

Discharge of the 3rd stage is pumped at 12% consistency to the high density storage tower (capacity 90 tons, 9 hrs production). Entry is at the top of the tower and mixed with thickener filtrate by means of an agitator.

Flow from here, diluted to 4.5% consistency is pumped to the Low Density CMP chest which feeds the post refining stage, (Defibrator Type RGP42) and discharge from here goes to the Refined Stock Chest.

6. STOCK PREPARATION (711/712)

Imported Kraft pulp (supplied in 200kg bales; stored in the Imported Pulp warehouse - 77 dept, capacity 5500 tons, 90 days) is transferred to the Pulper (4.75m diameter, 39m³ useful volume 220 KW) through a conveyor system in batches. The pulp Slurry consistency at 4.5% is transferred to the Dump chest and refined as required by 18" Black Clawson twin hydra disc refiners* which discharge directly to the Refined Stock Chest.

* 160 kW each

Refined CMP is pumped to the stock proportioning systems of either of the two Paper Machines (Machine chests).

A disc saveall (156m² filter area) comprising a Vat and inlet box, central shaft for seperation of cloudy and clear filtrate, light 10 segment disc with flange connections to the shaft with filter bags, drop leg for vacuum and filtrate removal, pump discharge and cleaning sprays is provided.

White water from the machine is pumped to saveall but before entry, sweetened stock (broke) is added to improve filter mat formation.

Filtrate from the disc is discharged through the drop legs into the seal pit and pumped to the cloudy filtrate chests. Cloudy filtrate is utilized in the dilution and regulation of stock consistency while the clean filtrate is pumped to saveall manifold valves, knock-off shower of the Paper machines, filtrate chest at the Pulp mill, Saveall showers and to the Press Broke pit.

Broke from the Couch, Press and Dry End are slushed by their individual agitators and pumped to the Broke Buffer Chest (400m³).

7. PAPER MACHINES (721/722):

Proportioned CMP, refined Kraft pulp and broke are pumped to the Machine Chest (140m³) which is equipped with an agitator. Stock consistency here is 3.5%. Additives like dye, rosin, etc

are metred and added. Flow-rate controllers are used to automatically adjust proportioning as demand increases. The stock is cleaned and deaerated (Deculator) to remove air and foam Stock from machine chest is diluted to 0.7% consistency with white water, accepts of the secondary; deaerator overflow.

Diluted stock is pumped to the primary cleaner stage and Deculator through the machine screen to the Paper machine headbox.

4 stage Celleco "Cleanpac 300" is used.

1st stage: 3 banks of 48 of model 4VC-48 cleaners.

2nd stage: 1 bank of 48 cleaners model 4VC-48

3rd stage: 1 bank of 20 cleaners model 2VC-20

4th stage: 1 bank of 8 cleaners model 2VCRCC-8.

The headbox is enclosed/pressurized with slice width of 4.6m. Stock suspension pumped through the machine screen enters the headbox at 0.6% consistency. Rectifier rolls regulate the stock velocity and keep the fibres in suspension.

Stock from the headbox jets onto the wire (cantilever fourdrinier type) through the slice.

The paper web forms at the forming section of the wire consisting of the forming board, foil units vacuum and vacuum boxes. The stock gradually dewaters to 20% dry content after the suction couch roll.

The wire has a width of 4/7m length of 32m with trim width of 4.3m.

The paper web is transferred to the Press Section (Tri-Nip) with the help of the Pick-up where further water is removed by mechanical/vacuum processes to 40% dry content.

The web is now transferred to the Dryer section where drying is carried out by means of driven steam-heated cylinders (1.524m diameter). Steam is supplied at 3.5 bar. The web leaves this section at about 92% dry content. (35 cyl. + 1 cool. cyl.)

Felts are provided for both the Press and Dryer sections. There are totally four dryer sections corresponding to 3 stage cascade steam and condensate removal system. There are a number of sectional Thyristor-controlled D.C drive sections for the wire, Press, Dryer parts as well as drives for the Calender and Reel up.

The maximum speed of the machines is 750m/min, with inch, crawl and draw facilities provided, as necessary for the sections.

After the dryer section, the web enters a six-roll open ended calender stack for smoothening. The paper is reeled at the Reel Drum.

At the pre-set diameter, the built up reel is removed after the sheet has been transferred to an empty spool.

8. FINISHING (81): Slitting of the Jumbo Reel to required customer sizes is done at the slitter winder. After wraping the paper rolls are sent to the Finsihed Product warehouse using the Lowerator and conveyor system.

9. CHEMICAL PREPARATION (57):

Chemicals required for the Pulping process, Mill/Boiler water treatment are stored/prepared in this department.

10. FUEL OIL SUPPLY/HANDLING (61):

Low Pour Fuel/Diesel are delivered to/handled by this department for running the Boilers and the standby diesel generating sets by road tankers or barge (LPFO only).

Storage tanks are provided both at the Dockside (1100m^3) and at the Mill site (2No.-3500m^3 capacity each) for Fuel Oil and for the diesel fuel (300m^3 capacity).

11. COMPRESSED AIR SUPPLY (29):

There are 3No. Joy Model WNOL112B size 16-10x7 Air compressors and 1No. HPC Screw Compressor installed for the supply of compressed air for mill and instrument use.

Rated Discharge pressure is 7.6 bar gauge.

12. DEMIN/BOILER/POWER GENERATION (62/63/65):

Three identical 80 ton/hour oil fired Stork-Babcock and Willcox type FM550-82 water tube boilers are installed for the production of steam for the generation of electricity and to provide other steam requirements.

Minimum load is 30t/h up to a maximum of 80t/h.

Steam pressure is 62 bar at a temperature of 482°C.

Boiler water treatment is through anion/cation resin beds to produce demineralized water.

A Deaerator is also privided to remove dissolved oxygen.

Electricity is generated by 2No Passout Condensing Turbines which supply 3 phase power at 11KV, 50Hz.

Full load capacity of Turbines - 30MW

Speed - 3000rpm

Inlet Steam pressure - 61.5 bar g

Inlet Steam temperature at Stop valves - 475°C

Pass out Steam Flow - 40 Tons/hr, 3.5 bar, 194°C

Straight Condensing Capacity - 25MW

Condenser Design Vacuum - 689mmHg

Design most Economic Rating at guarantee point - 25MW with 40Tons/hr pass-out.

Cooling water Temperature 30-33°C maximum.

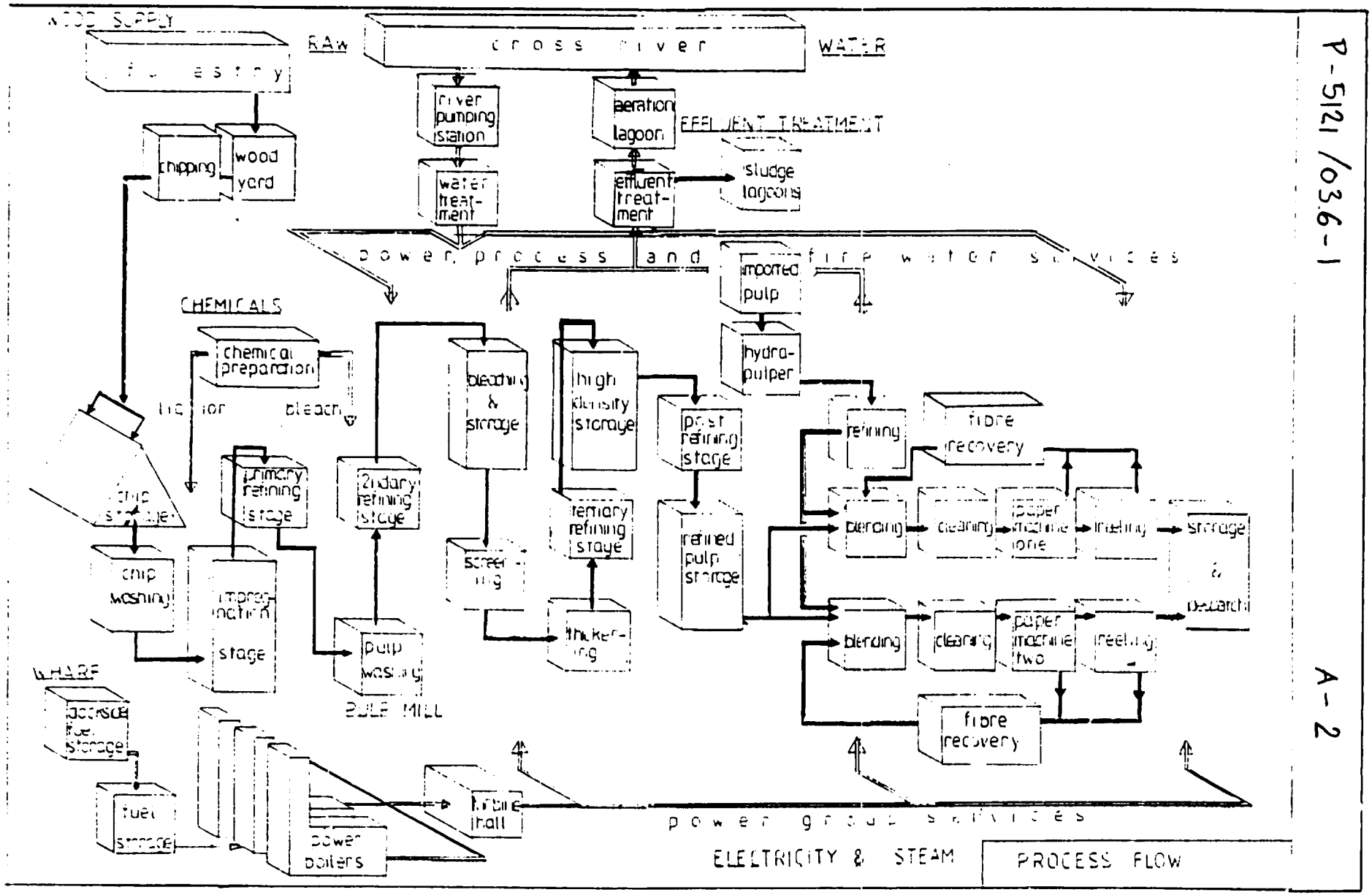
3No. standby Diesel generting sets each capable of generating 2.1MW at 3.3KV, 50HZ, 750 rpm are also provided to supply power during start-up/ emergency conditions and during annual maintenance periods. The generated voltage is stepped up to 11KV (Busbar voltage).

13. LABORATORY (26): This department provides quality control service for both the Power station and the Production processes. It is also responsbilble for research and development.

14. STORES (26): The Store in conjunction with the department orders and stores Spare parts for the different departments of the mill.

15. FORESTRY: Wood is supplied to the mill by the Awi, Edondon, Obom Itiat and other smaller plantations.

GENERAL: Besides from the Forestry and Operations Divisions, there are also the Finance and Administration Divisions.



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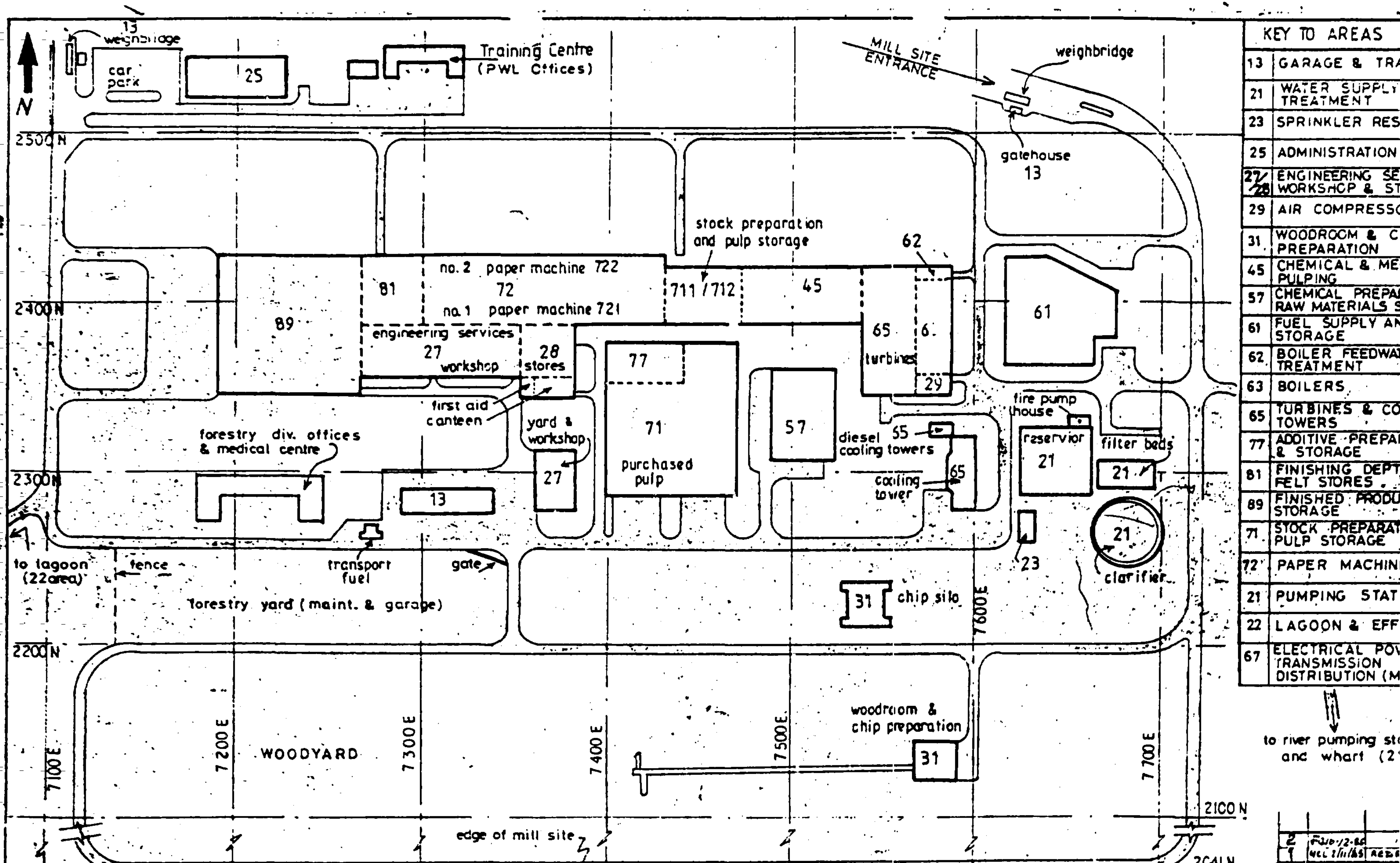

N
13 weighbridge
car park
25
Training Centre (PWL Offices)
MILL SITE ENTRANCE
weighbridge
gatehouse 13
2500 N
stock preparation and pulp storage
62
no. 2 paper machine 722
81
72
no. 1 paper machine 721
711 / 712
45
65
6.
61
2400 N
89
engineering services
27
workshop
28
stores
77
turbines
29
fire pump house
first aid canteen
yard & workshop
71
purchased pulp
57
diesel cooling towers
55
reservior
21
filter beds
forestry div. offices & medical centre
cooling tower
65
2300 N
27
13
21
23
21
clarifier
to lagoon (22 area)
fence
transport fuel
gate
forestry yard (maint. & garage)
31
chip silo
7600 E
2200 N
woodroom & chip preparation
31
WOODYARD
7100 E
7200 E
7300 E
7400 E
7500 E
7700 E
2100 N
edge of mill site
2041 N
KEY TO AREAS
13 GARAGE & TRA
21 WATER SUPPLY TREATMENT
23 SPRINKLER RES
25 ADMINISTRATION
27/28 ENGINEERING SE WORKSHOP & ST
29 AIR COMPRESSO
31 WOODROOM & C PREPARATION
45 CHEMICAL & ME PULPING
57 CHEMICAL PREPA RAW MATERIALS S
61 FUEL SUPPLY AN STORAGE
62 BOILER FEEDWA TREATMENT
63 BOILERS
65 TURBINES & CO TOWERS
77 ADDITIVE PREPA & STORAGE
81 FINISHING DEPT FELT STORES
89 FINISHED PRODU STORAGE
71 STOCK PREPARAT PULP STORAGE
72 PAPER MACHINE
21 PUMPING STAT
22 LAGOON & EFF
67 ELECTRICAL POV TRANSMISSION DISTRIBUTION (M
to river pumping st and wharf (2

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Annex A-3

AWI GMELINA PLANTATION (48 Km)

COMPARTMENT NUMBERS	YEAR OF PLANTING	AREA IN HECTARES	REMARKS
0	1966	12	Logged
15	1971	27	Logged
16, 18, 21, 24, 25	1972	168	-do-
8, 10, 13, 20, 22, 23	1973	781	-do-
5, 14, 17, 19	1974	1144	-do-
2, 6, 7, 9, 12	1975	1078	-do-
1, 11	1976	350	-do-
27	1977	215	
26	1978	33	
Nsan Junction	?	426	Logged
TOTAL		4462	

OBOM ITIAT 2820 HECTARES YET TO BE LOGGED (26 km)

not accessible (bridge req.)

planted from 1967 - 1976

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PRELIMINARY SURVEY OF EDMUNTON TIELIN PULPWOOD PLANTATION

(205 km)

COMPARTMENT NUMBER	YEAR OF PLANTING	AREA IN HECTARES	STEMS PER HECTARE	PULPWOOD VOLUME PER HECTARE	STOCKING DENSITY	TOTAL PULPWOOD VOLUME
1	1972	12	900	648 M^3	51.0%	30,463 M^3
2	1965	21	-	-	-	-
3	1966	47	900	648 M^3	51.8%	30,463 M^3
4	1976	133	960	403 M^3	55%	53,599 M^3
5	1976	284	1180	460 M^3	60%	130,697 M^3
6	1966	3	880	396 M^3	51%	1,188 M^3
7	1966	8	960	432 M^3	55%	3,456 M^3
8	1973	107	640	288 M^3	37%	30,816 M^3
9	1973	337	1460	672 M^3	86%	226,329 M^3
10	1972	379	1340	658 M^3	77%	249,230 M^3
11	1974	96	920	414 M^3	53%	39,744 M^3
12	1971	61	740	355 M^3	43%	21,655 M^3
13	1970	6	860	327 M^3	49%	1,962 M^3
14	1970	5	950	361 M^3	55%	1,805 M^3
15	1972	6	1420	667 M^3	82%	4,004 M^3
16	1971	4	800	304 M^3	46%	1,216 M^3
17	1966	15	820	402 M^3	47%	6,030 M^3
18	1973	9	840	412 M^3	40%	3,704 M^3
19	1974	305	960	460.8 M^3	59%	140,544 M^3
20	1974	35	900	441 M^3	52%	15,435 M^3
21	1976	123	1080	486 M^3	62%	59,778 M^3
22	1964	157	900	621 M^3	51%	97,497 M^3
23	1976	333	740	362.6 M^3	43%	120,746 M^3
24	1974	45	900	414 M^3	52%	18,630 M^3
25	1975	442	1020	469 M^3	59%	198,002 M^3
26	1965	72	1200	768 M^3	71%	55,296 M^3
27	1977	212	1220	562 M^3	70%	119,144 M^3
28	1978	47	1140	433 M^3	66%	20,351 M^3
29	1979	101	920	349 M^3	53%	35,249 M^3
30	1980	257	860	184 M^3	49.5%	47,288 M^3
31	1981	90	1160	452 M^3	66.8%	40,680 M^3
32	1982	10	1520	578	87.5%	5,780 M^3
TOTAL		3,742 Ha.				1,780,311 M^3

FORESTRY EQUIPMENT

Description of machine	Total Number in Company	Total Number Working
Lokomo Forwarder Log Loader	8 Number	2 Number
Lokomo Feller/Buncher – Log Saw	2 Number	1 Number
Caterpillar D8 Bulldozer	1 Number	—
Caterpillar D7 Bulldozer	2 Number	1 Number
Caterpillar Motor Grader	1 Number	1 Number
Caterpillar 518 Skidder	2 Number	2 Number
Caterpillar 930 Log Carrier	1 Number	1 Number
Caterpillar IT28 Bucket Loader	1 Number	1 Number
Hy Mac - Digger / Loader	1 Number	1 Number
C3 Log Loader	3 Number	2 Number
MF Bucket Loader	1 Number	1 Number
County 1164 4x4 Tractor	2 Number	1 Number
Michican Log Loader	1 Number	—
Mountain Logger Skidders		

Description of machine	Total Number in Company	Total Number Working
SISU LOG TRUCKS	22 NUMBER	15 NUMBER
SISU/FISKAR LOG LOADERS	5 NUMBER	3 NUMBER
SISU MOBILE WORKSHOP	2 NUMBER	2 NUMBER
SISU LUB TRUCKS	2 NUMBER	2 NUMBER
SISU TIPPER TRUCKS	2 NUMBER	1 NUMBER
SISU PERSONNEL CARRIER	2 NUMBER	2 NUMBER
SISU TOWING TRUCK	1 NUMBER	1 NUMBER
SISU LOW-BED TRUCK-TRAILOR	1 NUMBER	1 NUMBER
BEDFORD PERSONNEL CARRIER	3 NUMBER	1 NUMBER
BEDFORD TIPPER TRUCKS	2 NUMBER	1 NUMBER
FAIT WATER TANKER	1 NUMBER	—
LANDROVER	6	4
NISSAN PATROL	2	1

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Annex A-4

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NIGERIAN NEWSPRINT MANUFACTURING COMPANY LIMITED

MEMORANDUM

No.....

To.....GM/CE.....From.....MARKETING MANAGER.....Date.....15TH JANUARY 1991

Copies to.....AGM (F), AGM (OPS), AMM

Subject.....1990 YEAR END REPORT: MARKETING DEPT.....File.....04.90/02/2

Please find enclosed our monthly report for December 1990 together with a highlights covering the period January 1990 to December 1990.

1. DECEMBER 1990 REPORT

HIGHLIGHTS OF SALES

48.8gsm Newsprint - 2,266.9mt

48;8- Pink Newsprint - 5.7mt

60gsm MF Paper - 185.0mt

75 gsm MF Paper - 35.7mt

TOTAL PAPERS - 2,493.3mt

Pulp - 21.3mt

Others (KPS) - 9.1mt

GRAND TOTAL - 2,523.7mt

REALISATION - N16,267,051.60

Performance adversely affected by shut down due to non supply of LPFO in the last 10 days of the month.

2. 1990 YEAR PERFORMANCE (EXHIBIT ATTACHED)

Primary Market Newsprint (48.8gsm)	15,208.4mt
Secondary market newsprint 848.8gsm)	15,907.8mt
60 gsm MF paper	2,904.6mt
75 gsm MF Paper	3,272.6mt
Export	N11
TOTAL TONNAGE	37,293.4mt

Sales realisation/value N238,595,000.00

Last year total tonnage: 28,854.1mt

Increase over 1990 over 1989: 30.3%

Last year sales value N179,191,500.00

Increase 1990 over 1989: 33.2% (atributed to change in product mix)

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05-Dec-90

NIGERIAN NEWSPRINT MANUFACTURING COMPANY LIMITED

MONTHLY SALES REPORT

YEAR/MONTH : NOVEMBER 1990

GRADE/ITEM	GRAMMAGE (gsm)	CURRENT MONTH'S SALES PRT. NET (kg)	SEC. NET (kg)	TOTAL (kg)	VALUE (Naira)	YEAR TO DATE (Cum) THIS N.T.	THIS '000N	LAST N.T.	LAST '000N
NPW 59	48.8	1,013,297	1,341,578	2,354,875	15,306,688	28,454.5	182,595.0	20,705.7	127,900.8
PWP	48.8	22,948	0	22,948	157,194	447.6	3,073.8	0.0	0.0
TOTAL NEWSPRINT	//////////	1,036,245	1,341,578	2,377,823	15,463,881	28,902.1	185,668.8	20,705.7	127,900.8
MFP	60	0	279,465	279,465	1,777,853	2,720.1	17,176.6	4,924.1	29,754.2
MFP	70	0	0	0	0	0.0	0.0	93.3	577.9
MFP	75	0	129,074	129,074	802,480	3,236.6	20,129.6	1,546.8	8,552.8
TOTAL MECH PAPERS	//////////	0	408,539	408,539	2,580,334	5,956.7	37,306.2	6,564.2	38,884.9
TOTAL ALL PAPERS	//////////	1,036,245	1,750,117	2,786,362	18,044,215	34,858.8	222,975.0	27,269.9	166,785.7
PULP	//////////	0	7,113	7,113	10,314	18.4	23.4	1.6	4.7
OTHERS	//////////	0	19,662	19,662	118,187	142.4	676.2	86.4	492.7
EXPORT			0	0	0	0.0	0.0	2.2	7.6
			0	0	0	0.0	0.0	498.9	1,744.3
GRAND TOTAL	//////////	1,036,245	1,776,892	2,813,137	18,172,716	35,019.6	223,674.6	27,859.0	169,035.0

NIGERIAN NEWSPRINT MANUFACTURING COMPANY LIMITED

N O V E M B E R 1990

S A L E S R E P O R T.

C O D E / C U S T O M E R	November Sales(Kg)	November Cummul.(Kg)	October Average(M.T)
1000 N. N. M. C.	6848	14185	0.73
1001 New Nigerian Newspapers	65329	490058	42.47
1002 The Observer	2827	196901	19.41
1003 Daily Star	24615	176642	15.20
1004 Statesman	19697	239445	21.97
1005 Nigerian Chronicle	8958	85679	7.67
1006 Telex Publications	29827	207684	17.79
1007 The Standard, Jos	9951	169949	16.00
1008 Nigerian Tide	10099	91011	8.09
1009 The Pioneer	6990	33572	2.66
1010 Triumph Publications	11914	85102	7.32
1011 The Voice	5335	77079	7.17
1012 New Outlook (Frontline)	11741	50801	3.91
1013 The New Nationalist	0	0	0.00
1014 The Bell	15000	53737	3.87
1015 The Spectator	0	28482	2.85
1016	0	0	0.00
1017 The People (Excon Media)	0	88411	8.84
1018 The Mirror	17876	151671	13.38
1019 Hotline Publications	0	0	0.00
1020 Northenr Haktabat	10008	39547	2.95
1021 Rasheed Publications	0	14197	1.42
1022 Republic Formations	0	0	0.00
1023 The Democrat(New Africa Holdings)	25802	298063	27.23
1024 Evening World	0	0	0.00
1025 Spotlight News Agency	0	35467	3.55
1026 Jerritas Enterprises	14998	135678	12.07
1027 Buyer's Market	0	124044	12.40
1028 Chsita	0	75202	7.52
1029 Satelite(Jupiter Publi. Co)	0	48571	4.86
1030 Evening View (Viewpoint publ.)	0	6360	0.64
1031 The Socio Psychologist	0	21935	2.19
1032 The Leader(Assumpta Press)	0	71237	7.12
1033 Opinion Research	0	14677	1.47
1034 Heritage/Roots	0	29907	2.99
1035 The Reporter	21735	165513	14.38
1036 Gongola Press	0	10748	1.07

1037	Herald of the Kingdom (OOObu)	0	44275	4.43
1038	Aba Times	0	14860	1.49
1039	Newsage	0	14927	1.49
1040	New African Crusade	14944	14944	0.00
			ERR	ERR
			0	0.00
11001	Daily Times Nigeria Ltd.	46272	2128640	208.24
11002	Concord press	61059	1322083	126.10
11003	Guardian Press Ltd	171219	1840997	166.98
11004	Vanguard Media Ltd	81774	1046070	96.43
11005	Nigerian Tribune(African Press)	34724	585068	55.03
11006	Sketch Press Ltd.	43378	413144	36.98
11007	Champion Newspapers	111165	1035453	92.43
11008	Punch Nigeria Ltd	7957	552215	54.43
11009	Newswatch Comm. Ltd.	26037	229778	20.37
11010	Prime Publications Ltd.	9933	292154	28.22
11011	John West Publications	12026	119593	10.76
11012	The Republic Publcations Ltd	29935	213484	18.35
11013	The Financial Post	10010	24945	1.49
11014	The Herald	9987	114919	10.49
11015	The Economist	0	167338	16.73
11016	Miraacle International	0	14896	1.49
11017	The Home Doctor	0	0	0.00
11018	Health Care Magazine	0	53291	5.33
11019	Top News	0	0	0.00
11020	Sportsworld	0	0	0.00
11021	Ikebe Super	0	0	0.00
11022	The Courier	0	29544	2.95
11023	West Coast Comm. Ltd	0	14705	1.47
11024	Weekly metropolitan	0	0	0.00
11025	Vintage Ventures	9996	264645	25.46
11026	Expansion Today	0	37682	3.77
11027	Lib Communications ltd.	0	85409	8.54
11028	Lagos Horizon	0	23776	2.38
11029	Panache' Comm/Classique	9823	135936	12.61
11030	Cmplete Communications ltd.	14678	206297	19.16
11031	Owena Press Ltd.	0	23814	2.38
11032	Sidewell Communications	0	14919	1.49
11033	The SUNDAY Magazine(TSM)	0	66487	6.65
11034	The Stock Market	0	42529	4.25
11035	Deeper Life	0	44308	4.43
11036	Magnet Media	0	9909	0.99
11037	Truth Publishing Co.	0	30360	3.04
11038	Catholic Diocese of Ibadan	0	8960	0.90
11039	Every Woman	0	29963	3.00
11040	Broom Newspapers	0	14817	1.48
11041	This Week	0	14850	1.49
11042	Quality Magz.	14773	100911	8.61
11043	Hinta/True Tales	9675	29205	1.95
11044	Newsline	0	11911	1.19
11045	Platform	0	13018	1.30
11046	The Mail	25067	37848	1.28
		0	174687	17.47
		0	0	0.00
2001	STAR PAPER MILL	0	419088	41.91
2002	AFRICANA FEP PUBLISHERS	0	14957	1.50

2003	EDUCATIONAL PUBLICATIONS LTD	0	0	0.00
2004	TANA PRESS	0	9029	0.98
2005	PAICO NIG. LTD	170699	366222	24.55
2006	LEON EDUCATIONAL AIDS	0	173788	17.38
2007	ATTSCO ABBEY STATIONERY MANUF. CO	0	728113	72.81
2008	ALPHA PAPER MILLS	112691	925610	81.29
2009	G. M. O. 7 SONS LTD	0	507568	50.76
2010	L. L. NWADIKE & associates ltd	115234	1673460	155.82
2011	IDEAL PAPER CONVERTERS	0	44037	4.40
2012	B. C. IFEGBO & ASSOCIATES	69204	1193050	112.38
2013	ANIMPAX NIGERIA LTD.	6515	66574	6.01
2014	UNA AMA NIGERIA LTD.	14092	896171	88.21
2015	NIGERIAN STATIONERY FACTORY, KANO	27272	84632	5.74
2016	DENSON PAPER MILL	0	277995	27.80
2017	EPIC SUPPLIES LTD.	0	92209	9.22
2018	STENA MILLS	0	40663	4.07
2019	NORA INDUSTRIES LTD.	84354	297081	21.27
2020	OCHUMBA PRESS	0	230113	23.01
2021	POLOTC PAPER MILL	0	362257	36.23
2022	TOFA COMM. PRESS	0	158334	15.83
2023	EMPERORO ENTERPRISES	0	14889	1.49
2024	ARMA PAPER CONVERTERS	0	0	0.00
2025	COSMAS PAPER INDUSTRIES	7988	35817	2.78
2026	NAI NASARA PAPER INDUTRY, KANO	0	120708	12.07
2027	AMSU (w.a.)LTD.	0	53909	5.39
2028	FIDELITY ENTERPRISES	0	44911	4.49
2029	KURNA ENTERPRISES	0	9987	1.00
2030	UWAISU PUBLISHERS LTD,BENIN	0	29954	3.00
2031	MAILITAFA &CO NIG LTD. GUSAU	895	82225	8.13
2032	SAROS INTERNATIONAL LTD	0	14924	1.49
2033	UNICROSS	0	4461	0.45
2034	BAZIK VENTURES	0	91464	9.15
2035	THE POLYTECHNIC CALABAR	0	1996	0.20
2036	OKUMADU INVESMENTS	0	140356	14.04
037	INICAL BOOKSHOP	5322	175046	16.97
2038	AMUNIKE ENTERPRISES	0	29310	2.93
2039	TABANSI PUBLISHERS LTD.	13723	145756	13.20
2040	PROSPER PAPER CONVERTERS	0	20875	2.09
2041	ALICOGEO PAPER CONVERTERS	0	43825	4.38
2042	PEL INDUSTRIES	0	101431	10.14
2043	ALL STAR PRINTERS	0	38925	3.89
2044	ALHAJI IBRAHIM PRESS ZARIA	0	87265	8.73
2045	CENTRACO LTD. CALABAR	0	14282	1.43
2046	HUSA RABO PRINTING CO, ZARIA	0	44367	4.44
2047	FRANEDO PUBLISHERS	26482	200350	17.39
2048	OUR MODERN PRINTING PRESS	0	22422	2.24
2049	STAR MODERN P. MILL , KANO	0	44178	4.42
2050	SOGU PAPER CONVERTERS	0	19844	1.98
2051	ADEHOG AND SONS	0	4962	0.50
2052	NIGERIAN ARMY. OWERRI	11092	16232	0.51
2053	ALH DAUDU PRESS,JOS	0	48863	4.89
2054	TRINITY PRESS	0	26276	2.63
2055	NIGERIAN ARMY,ENUGU	0	2623	0.26
2056	BARAKA PRESS	0	13721	1.37
2057		11753	26722	1.50
2058		0	10078	1.01

2059	ENOIDA PUBLISHING	0	38007	3.80
2060	WISDOM PRINT.PRESS	0	14997	1.50
12001	UNIVERSITY PRESS LTD.	49232	167464	11.82
12002	EVANS BROTHERS PUBLISHERS LTD.	0	0	0.00
12003	MACHILLAN PUBLISHERS LTD.	0	78312	7.83
12004	ODUA' GROUP OF COMPANIES	0	72592	7.26
12005	ONIBONOJE PRESS LTD.	74454	99946	2.55
12006	ACADEMY PRESS	0	119185	11.92
12007	LONGMAN NIGERIA LTD.	28986	355907	32.69
12008	ILESNMI PRESS	0	79685	7.97
12009	JOHN HENRY NIGERIA LTD	0	12378	1.24
12010	PYRAMID/CROWN P. CONVERTERS	0	0	0.00
12011	THOMAS WYATT NIG. LTD	243952	1578133	133.42
12012	WIGGINS TEAPE NIG LTD	0	0	0.00
12013	KWARA PAPER CONVERTERS	0	205472	20.55
12014	ONWARD PAPER MILL	112077	698766	58.67
12015	OMOLAYO STANDARD PRESS	338982	2207294	186.83
12016	CONTINENTAL OFFCE PRODUCTS COP	9653	35813	2.62
12017	AFRICAN UNIVERSITY PRESS	0	49608	4.96
12018	PACIFIC PRINTERS	15292	112744	9.75
12019	EHOKPARIRE IND. LTD.	0	18057	1.81
12020	OLUGBOLA P. CONVERTERS	0	60032	6.00
12021	OLUTONE INDUSTRIES	0	217960	21.80
12022	ODUTAYO AND SONS	0	110750	11.08
12023	KUNZLE NIG LTD.	0	116547	11.65
12024	PRIMER BK PUBLISHING CO.	41542	312883	27.13
12025	ST. AMOS & CO LTD	0	5035	0.50
12026	GREAT AJIBAYE PUBLISHING HOUSE	0	0	0.00
12027	CHEKATON PRESS LTD.	0	0	0.00
12028	A. I. C. LTD	37758	86703	4.89
12029	EDUCATIONAL UTILITIES	0	179899	17.99
12030	FLEXIBLE PACKAGING INDUTRIES	0	0	0.00
12031	ADETOLA P CONVERTERS	0	232466	23.25
12032	DALOL NIG. LTD.	0	29823	2.98
12033	SAMAD P CNVERTERS	0	170809	17.08
12034	GLOBAL PACKAGING COMPANY	42153	181048	13.89
12035	BAYO BASADE & CO	0	14981	1.50
12036	A. FRANKAYO ENTERPR.	0	13201	1.32
12037	JOINT SERVICES LTD.	0	57858	5.79
12038	C & A PAPER INDUSTRIES	0	28184	2.82
12039	PAPYRUS INDUSTRIES	0	112580	11.26
12040	AMSTAR	0	13129	1.31
12041	OLA OLUWA-TO	6050	39859	3.38
12042	OBISAN COMM ENTERPRISE	5037	65902	6.09
12043	DISCON LTD.	623	100009	9.94
12044	AROMOLARAN PUBLISHING CO.	0	28641	2.86
12045	NIGERIAN PAPER MILL JEBBA	0	187897	18.79
12046	PAPERCRAFT LTD.	0	32151	3.22
12047	MESSAKAG LTD.	12940	150525	13.76
12048	VIRAMCON NIGERIA LTD.	0	108805	10.88
12049	EAGLE PACKAGING & PRINTING	0	29404	2.94
12050	HIPEN OMAN INCORP.	0	23344	2.33
12051	KEMTAS LTD.	0	31470	3.15
12052	WANOVSEAS LTD.	0	74519	7.45
12053	FATAI OKELEYE & SONS LTD.	0	14808	1.48
12054	NOVETTI NIG. LTD.	0	100494	10.05

12055 RAMBOA & CO. LTD.	0	59695	5.97
12056 UNITED STAR PRINTERS	4355	30273	2.59
12057 NIGERIA POLICE. LAGOS	0	34606	3.46
12058 TRIQUEST LTD.	0	34740	3.47
12059 DADA PRESS.	0	39019	3.90
12060 ENEOBONG ENTERPRISES	0	79850	7.99
12061 NIG.PRISONS SERVICE	0	2891	0.29
12062 KAYOWA NIG LTD	0	23821	2.38
12063 SCAN ENTERPRISES	0	7825	0.78
12064 LOYALTY P COMPANY	0	13667	1.37
12065 UCHE QUALITY PRESS	0	13933	1.39
12066 HEINNEMANN EDUCATIONAL BOOKS	0	19628	1.96
.067 J. A. A. B. , Lagos	0	13621	1.36
12068 OLUWA GLASS INDUSTRIES	0	36323	3.63
12069 BENCOD PRESS	0	49515	4.95
12070 UNIQUE PAPER MILL	0	25480	2.55
12071 KINSEY BAMAK	0	29833	2.98
12072 FEMI CROWN	0	17679	1.77
12073 SPECTRUM PUBLISHERS	0	9697	0.97
12074 OGO OLUWA PRINT PRESS	14986	35669	2.07
12075 Gateway P Mill	0	9866	0.99
12076 Oyo P Mill	0	9622	0.96
SECONDARY MARKET TOTAL	1665388	19992721	1832.73
GRAND TOTAL	ERR	34859153	ERR

NIGERIAN NEWSPRINT MANUFACTURING COMPANY LIMITED

PAPER IMPORTS

YR.	N/P	WRITING PAPERS
1985	14793.2	113,069.0
1986	13422.0	86,439.8
1987	2954.3	58,195.3
1988	257.1	63,145.0
1989	1389.9	31,223.2
1990	26.3	54,127.3

Source: Nigerian Trade Statistics: Federal Ofiice Statistics

Note From Mr. N.E. Uwah: Declining import of writing papers is indication of substitution of newsprint for writing papers.

P-5121/03.6-1

Annex A-5

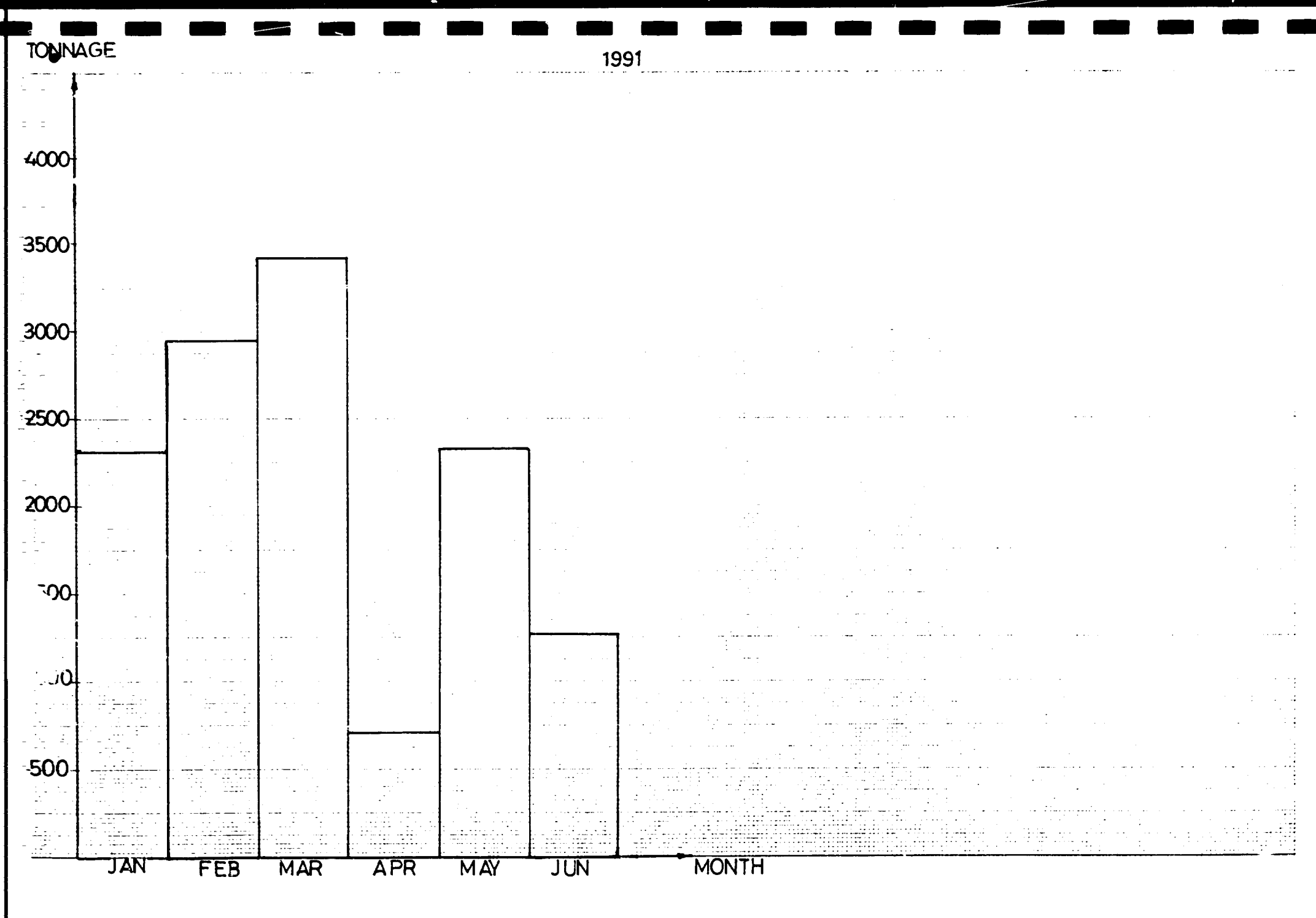
P-5121/03.6-1

Annex A-5.1

A-5

-91 (fmt)

			MAR	APR		JUNE	JULY	AUG	SEPT	OCT		DE
1		91.978	148.912	81.272								
2	976	92.832	40.680	79.295								
3		95.534	112.854	110.140			83.082					
4	2.708	118.802	84.412	94.827			20.314					
5	2.328	106.551	69.385	111.419	49.041		113.021					
6		137.036	60.488	81.546	122.409		50.627					
7		139.844	10.573	89.473	2.653							
8	38.623	40.061	28.457	60.916	141.829	43.473						
9	131.333	123.098	126.610	2.001	112.928	132.145						
10	80.968	103.004	105.857		95.509	139.588						
11	62.080	109.092	132.496		118.138	103.076						
12	115.567	79.563	148.332	3.033	90.452	107.720						
13	101.319	121.864	103.547		124.197	123.965						
14	74.834	108.391	175.266		106.758	129.09[illegible]						
15	73.362	117.778	53.100		125.429	140.27[illegible]						
16	88.352	115.086	158.640		78.446	129.59[illegible]						
17	137.789	101.569	56.645		91.513	44.488	59.951					
18	112.778	126.252	113.476	108.286	69.354	67.2[illegible]1						
19	28.211	136.157	168.666		119.260	94.0[illegible]9						
20	92.943	62.966	169.274		115.002		143.263					
21	115.568	27.560	88.666		137.702		135.619					
22	123.113	363	110.866	5.565	96.979		48.938					
23	114.151	104.583	100.650		118.559		6.281					
24	45.072	127.702	129.930		16.890		93.753					
25	71.877	146.776	157.528	251	118.578		22.759					
26	94.284	129.066	119.195		124.325							
27	127.761	157.973	107.887		115.357	2.146						
28	143.239	145.870	81.056		2.178							
29	101.673		153.751		436							
30	120.775		131.291									
31	114.492		182.721									
TOTAL	2316.181	2967.351	3431.320	719.738	2332.849	1267.624	938.898					


TONNAGE
1991
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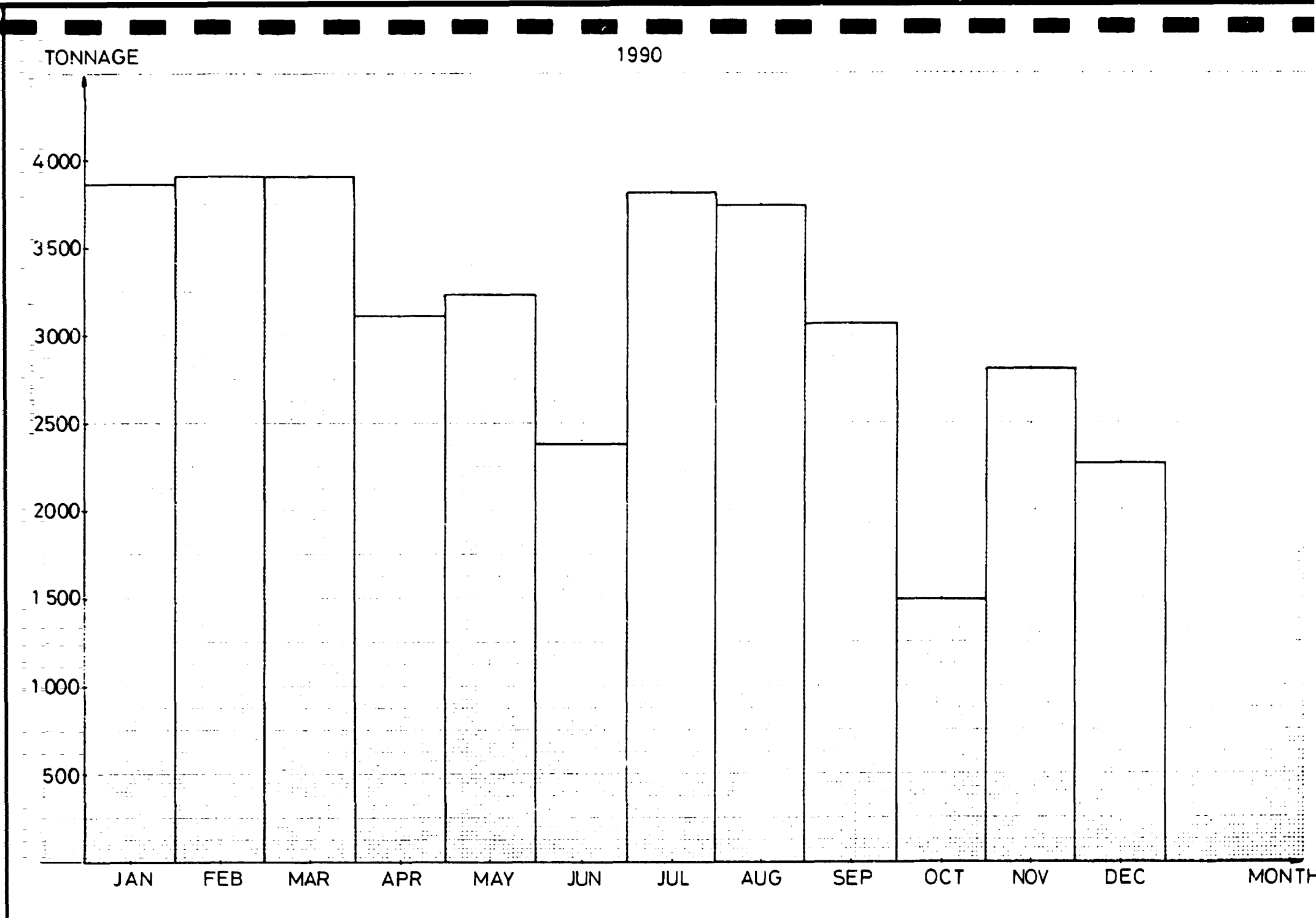
MAY
JUN
MONTH

PRODUCTION [illegible] 1990 (fmt)

DAY	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1		255.460	124.173	40.691	83.476	128.235	110.232	175.436	110.945	115.085	128.527	128.52
2		249.024	124.177	101.428	29.916	112.090	128.147	132.49[illegible]	127.157	66.711	133.146	73.45
3	30.258	143.422	127.125	40.351	117.170	143.258	131.954	136.078	109.094	121.719	125.501	117.18
4	27.713	154.774	133.865	37.095	145.572	110.179	50.657	131.480	85.355	52.615	80.598	181.37
5	92.040	123.602	142.820	69.932	17.817	113.700	3.462	120.789	101.791	103.472	90.684	158.31
6	116.035	144.237	112.097	173.883	30.628		67.466	123.671	101.830	107.672	125.942	22.12
7	133.795	155.417	128.075	174.110	51.603		131.420	143.850	75.511	93.884	85.976	96.43
8	138.478	142.202	151.309	115.520	123/500		86.746	118.715	95.006	87.274	80.062	126.97
9	142.804	131.126	133.642	98.066	115.717		120.306	119.407	125.176	74.537	131.855	144.04
10	117.665	198.119	138.344	125.846	123.890	35.629	120.830	141.149	1o3.149	51.577	58.271	150.15
11	122.532	155.160	141.278	152.711	129.453	146.141	130.046	131.018	91.844	64.169	1.740	75.75
12	117.098	127.451	133.144	100.852	i24.241	145.638	136.951	130.430	117.443		1.678	117.38
13	126.991	102.658	131.867	115.172	119.871	55.369	132.137	126.761	155.482		61.598	120.97
14	137.400	109.817	131.796	120.423	89.548	103.083	141.971	111.896	139.607		76.078	95.42
15	145.186	95.222	124.359	110.372	64.653	139.407	140.647	119.142	66.214		116.785	93.77
16	280.937	86.849	125.332	149.205	96.818	145.537	141.809	122.054	125.654		120.049	126.77
17	143.676	105.015	152.891	92.167	155.823	139.917	128.320	66.942	126.893		75.574	122.78
18	70.363	139.562	160.976	67.669	16.567	134.165	136.876	91.891	70.264		98.116	121.52
19	73.796	69.480	141.102	126.594	124.551	77.830	128.566	116.598	67.218	12.437	106.718	81.15
20	135.468	108.719	113.237	134.445	157.393	37.503	122.631	113.649	101.667		57.627	96.40
21	115.580	160.097	126.871	117.399	127.136	124.689	156.741	141.486	99.751		122.530	2.85
22	177.466	198.399	163.060	27.882	45.821	122.689	157.392	123.552	63.679	13.539	122.946	2.75
23	212.825	183.960	119.227	115.560	75.905	119.396	136.421	123.015	2.572	15.635	94.630	6.67
24	199.123	123.911	117.561	123.281	126.213	140.641	102.725	95.193	33.205	2.819	106.769	
25	142.377	92.023	133.621	85.202	132.049	28.487	148.070	134.927	129.970		117.252	
26	132.799	129.820	96.518	146.424	158.535		115.628	84.478	77.688		70.347	
27	75.580	96.296	182.583	119.406	148.343	455	140.693	92.200	119.991	15.332	94.322	5.45
28	93.413	131.312	160.636	25.163	117.720		172.708	123.447	135.548	125.732	91.308	
29	120.851		112.641	112.009	122.288		165.599	83.234	122.943	117.234	111.777	
30	182.999		19.816	95.902	141.260	76.983	106.182	125.226	120.644	114.583	139.884	509
31	260.388		8.328		118.484		57.957	182.724		132.496	134	
TOTAL	3865.636	3913.134	3912.462	3114.760	3231.961	2381.121	3814.177	3718.722	3067.782	1484.384	2814.973	2268.76


TONNAGE
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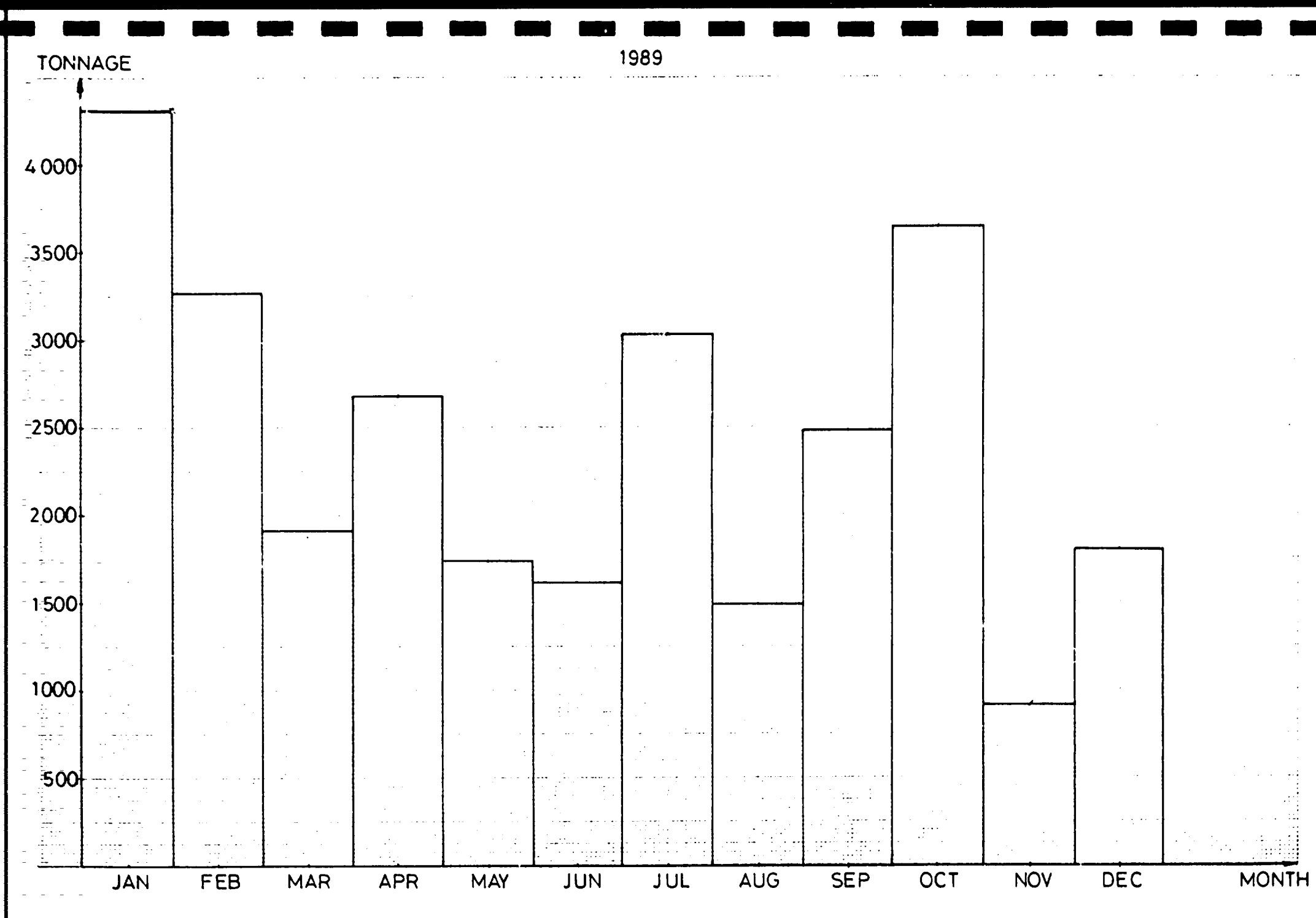
(fmt)

1	154.837	136.285	59.321	75.270	175.667	103.866		112.349		104.839	145.479	
2	132.559	124.478	69.032	102.413	142.800	148.170		94.764		113.450	132.327	
3	111.775	193.953	107.462	151.184	54.070	173.855		107.228		163.292	75.283	
4	133.769	182.124	145.527	73.719		101.658		131.038		134.012	123.453	
5	89.199	155.557	156.691	113.524		134.075				103.178	56.669	
6	96.532	37.717	147.388	115.759		159.627	36.879			139.159	115.186	
7	74.482		181.245	12.639		156.236	117.011	2.592		129.597	146.542	
8	104.363		182.065	3.036		171.913	122.838	2.177		119.386	82.694	57.14
9	141.150	13.457	182.242	75.481		77.377	121.998			105.726	3.704	107.50
10	132.680	56.604	128.783	119.979		118.422	139.747	1.331		147.714	348	116.80
11	133.260	166.323	144.729	142.660		105.713	121.574	3.276	4.734	135.066	31.647	135.56
12	146.179	148.431	80.905	141.863		98.207	119.306		129.763	169.516		115.91
13	130.808	150.209	49.474	110.587		32.503	132.144		129.867	183.914		89.59
14	144.932	114.012		106.607		13.820	133.606	24.260	144.051	132.696		138.30
15	172.295	152.529		151.602			145.994	96.674	99.244	90.956	2.110	154.73
16	168.515	138.864		134.438		5.062	133.278	91.244	143.925	125.256		145.13
17	122.692	183.873					134.448	136.258	139.468	80.154		146.03
18	148.848	138.823		60.219			114.585	141.185	114.253	102.257		140.43
19	126.451	142.341		86.923		2.174	137.031	104.699	140.845	110.739		128.28
20	166.725	97.936					77.481	123.692	148.552	87.136		141.77
21	141.554	146.455		74.598	13.074	5.776	105.716	134.840	144.347	104.001	382	63.87
22	148.320	112.807		55.882	94.304	3.743	99.563	119.272	94.042	119.053		
23	134.812	132.590		115.891	147.866		148.655	62.881	128.927	118.103		
24	179.074	111.978		129.075	156.423		42.454		122.502	128.277		
25	154.520	122.416		165.936	151.013		92.021		115.251	132.814		
26	166.120	128.601		134.393	150.198	541	44.366		131.633	54.898		
27	174.807	94.112		299	130.849	1.618	118.452		182.348	76.512		
28	154.758	88.232	25.424		122.752		153.473		140.946	130.327		9.77
29	178.086		59.411	92.451	135.182	5.530	127.164		102.220	75.451		
30	180.743		73.499	130.792	124.528		115.596		121.456	119.783		95.25
31	65.700		117.521		143.894		199.146			111.047		14.52
TOTAL	4311.545	3270.707	1919.719	2677.229	1742.620	1619.886	3034.526	1489.760	2478.375	3648.309	915.834	1800.65


TONNAGE
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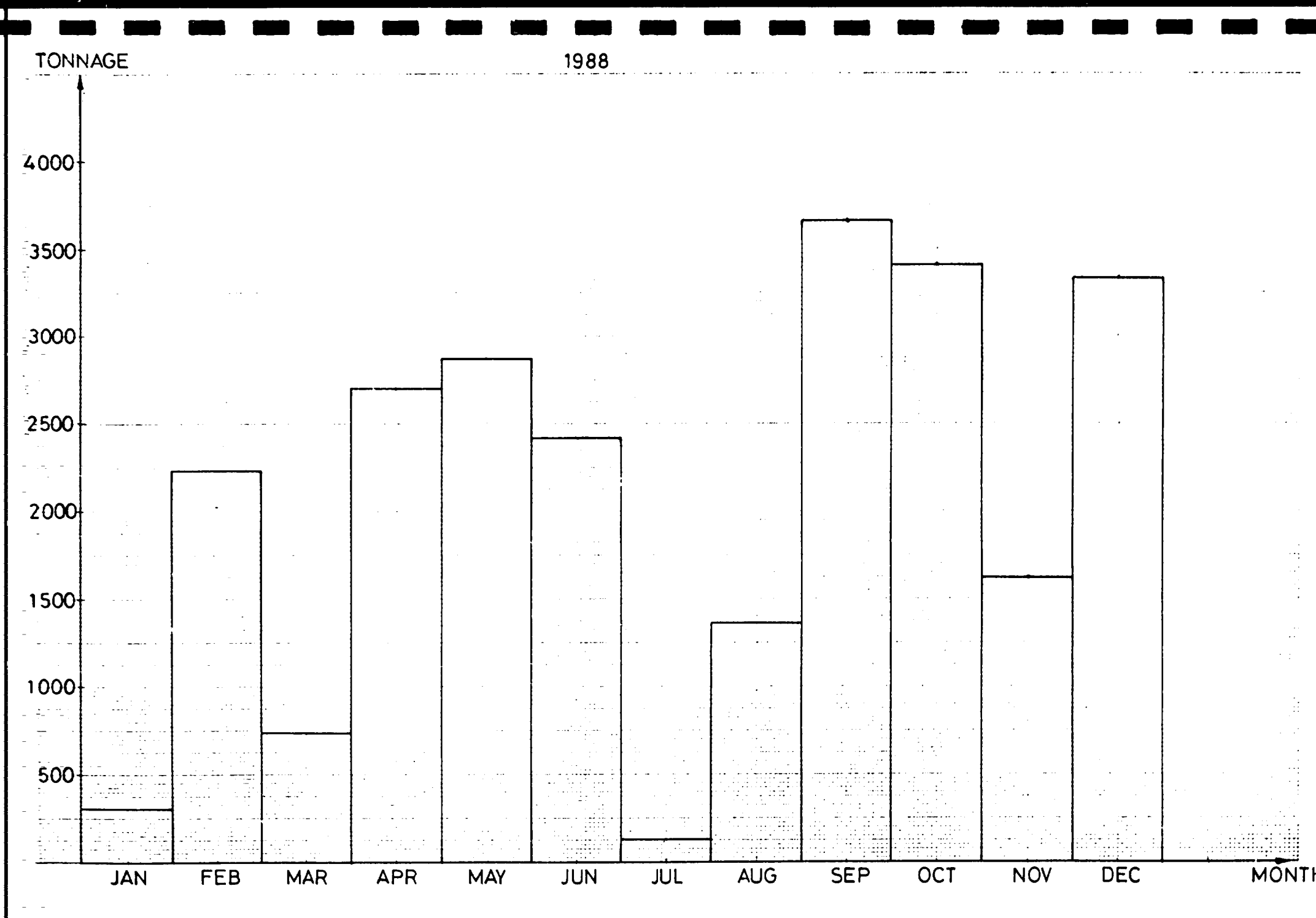
DAILY RAINFALL DATA FOR 1988 (fmt)

DAY	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1			118.605			58.323			105.534	63.510	120.950	118.030
2		13.469	115.503			110.567			145.601	124.011	129.722	136.52
3		60.430	132.330			97.335			153.471	135.904	114.142	115.76
4		105.869	177.119			125.517	2.385	42.711	133.295	143.180	111.267	161.77
5		99.407	124.804	78.988		128.113		7.230	113.544	87.485	142.282	166.84
6		121.264	67.659	132.138		64.669			87.013	142.839	42.924	152.57
7		143.264		124.323		49.735			47.444	87.585	21.527	173.46
8		116.065		99.996	56.317	76.818			112.989	135.165	2.206	182.85
9		104.425		122.269	120.178	17.723			93.089	148.198		171.43
10		81.082		107.514	93.092	5.478			137.428	98.932		85.77
11		107.391		136.954	166.539	68.308		3.115	157.349	81.914	30.410	98.73
12	94.919	108.523		126.709	95.599	125.536			139.738	71.666	60.967	
13	119.966	62.694		95.442	55.067	94.530		32.062	131.389	131.372	107.731	
14	88.230	63.938		99.042	87.756	42.642		40.054	110.108	105.942	52.959	42.61
15		13.805		133.642	82.196	68.969		67.656	144.262	148.843	20.748	189.61
16		53.346		121.398	137.597	67.974		86.953	74.293	116.802	10.137	157.80
17		52.923		106.639	136.312	129.978		90.268	85.463	115.265		133.37
18	2.612	81.871		112.422	115.102	134.084		123.778	123.138	93.493	836	134.80
19		93.806		139.750	116.832	83.082		100.895	90.931	143.453		118.33
20		83.789		117.360	104.012	104.802		24.264	117.308	144.022		139.15
21		69.431		154.413	90.616	95.465		57.708	121.962	106.653	3.788	146.91
22		48.269		181.371	67.966	90.057		52.751	35.555	118.410		76.45
23		5.731		73.335	107.496	98.636		84.514	125.372	144.194	1.201	174.39
24		71.962		140.683	118.633	51.341		76.897	121.075	108.535		40.84
25		69.194		99.067	97.049	99.715		57.952	150.357	122.417		
26		111.928		178.852	80.925	108.248		38.653	135.112	102.304	90.305	
27		109.543		4.361	164.695	79.422		55.016	202.174	179.176	91.643	
28		98.555			216.906	85.903	9.440	48.433	177.146	136.597	156.159	
29		91.370			186.118	44.589	956	90.266	122.281	20.189	144.211	142.65
30				7.027	184.868	9.879		77.317	156.463	2.908	168.678	174.43
31					190.874			107.110		51.277		103.40
TOTAL	305.727	2243.349	736.040	2693.695	2872.745	2420.438	12.781	1336.403	3662.884	3412.241	1624.793	338.569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1988
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DEC
MONTH

1937 (fmt)

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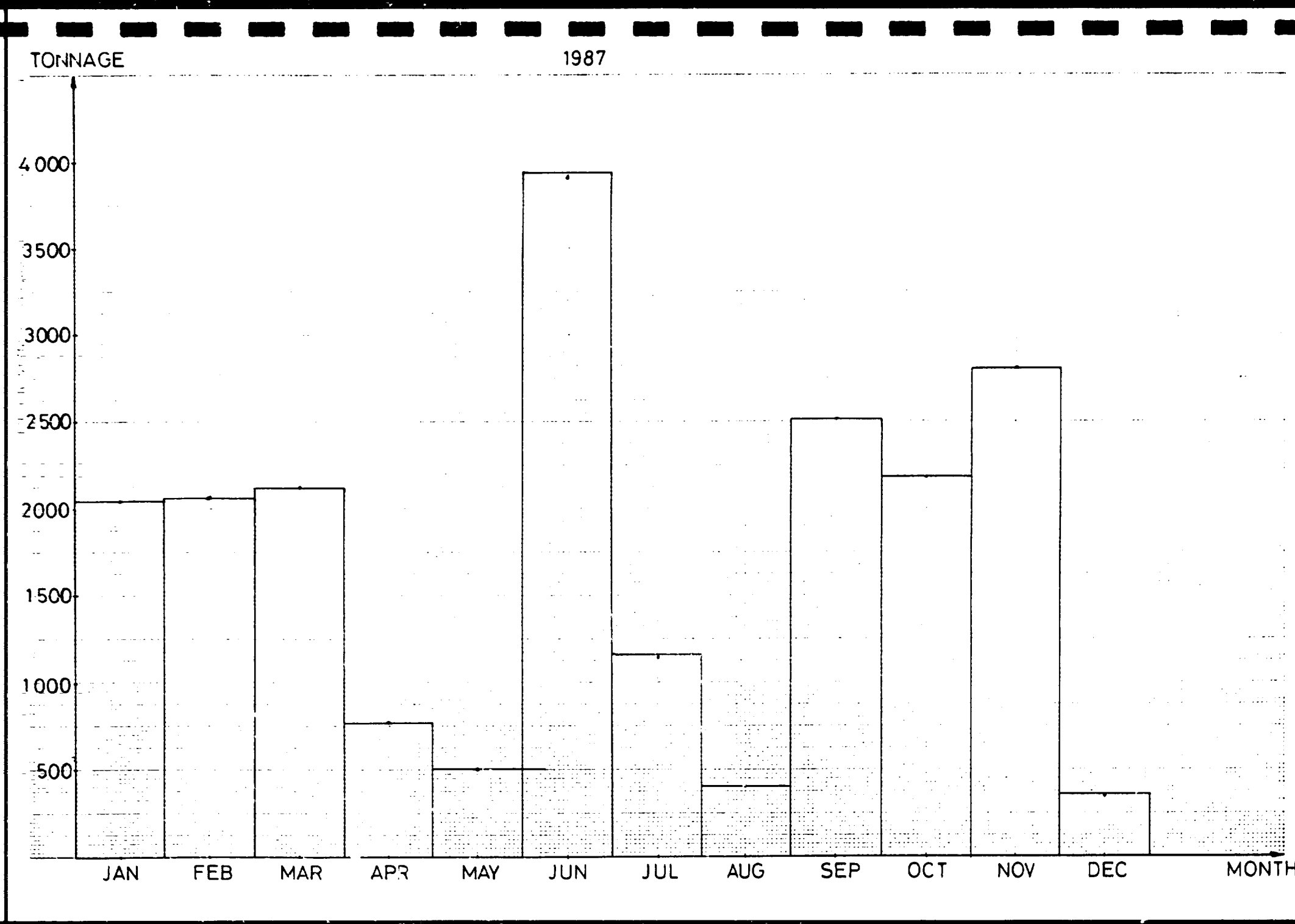
2		113.733		146.995		144.326	90.164		112.344		90.055	
3		49.254		138.334		124.407			117.111		119.484	
4		5.122		143.009		132.949			27.613		89.953	
5		91.486		112.425		141.541			2.974		117.780	
6		134.477		91.406		137.376				47.268	121.541	
7	22.106	142.709				98.401		7.172	61.047	86.893	139.297	
8		141.205				112.428			160.748	116.608	99.237	
9	106.278	138.360				119.049			110.846	69.177	121.042	113.25
10	142.125	153.684				46.584			61.801	24.497	121.822	80
11	171.909	141.386				150.158			5.713		115.858	94.17
12	144.115	149.122	11.972			158.247		7.985	29.116	79.985	122.821	43.50
13	118.552	149.509				126.552		2.584		63.293	127.528	16.05
14	163.225	140.878				134.969			96.707	69.040	133.531	2.27
15	164.398	128.368				129.521			121.218	72.710	141.971	
16	88.528	142.102	108.007			136.634			126.805	145.640	111.620	
17	121.422	94.644	114.222			83.556			127.612	50.347	124.679	
18	184.096	69.638	123.480			165.616			116.072	13.723	135.223	55.45
19	126.733		138.461			139.092			17.452	34.421	83.275	33.92
20	125.867		150.665			115.917	120.505			145.281	133.496	
21	110.708		119.637			133.382	175.622		64.880	107.907	118.648	
22	123.023		148.551		24.304	153.432	107.745		150.253	149.653	56.855	
23	49.585		129.075		35.450	156.725	69.867		119.401	153.955	107.042	
24			72.087		7.044	139.678	4.164		117.018	57.677	84.124	
25	8.301		149.843		28.448	157.183		27.610	82.295	2.407	19.425	
26	2.872		158.514		26.879	140.780		70.765	86.316	72.248	95.495	
27	3.466		150.398		12.048	141.374	96.752	110.570	125.255	118.185	27.858	
28			175.106		35.964	140.573	64.043	103.967	111.739	129.495	1.451	
29			146.094		97.230	138.921	163.114	13.822	86.861	134.258		
30			128.726		105.791	159.653	105.228	58.822	133.488	101.395		
31	63.640		94.917		131.030		20.353			106.487		
TOTAL	2040.949	2070.508	2120.755	767.015	504.188	3934.819	1163.149	408.460	2512.155	2183.424	2811.628	395.44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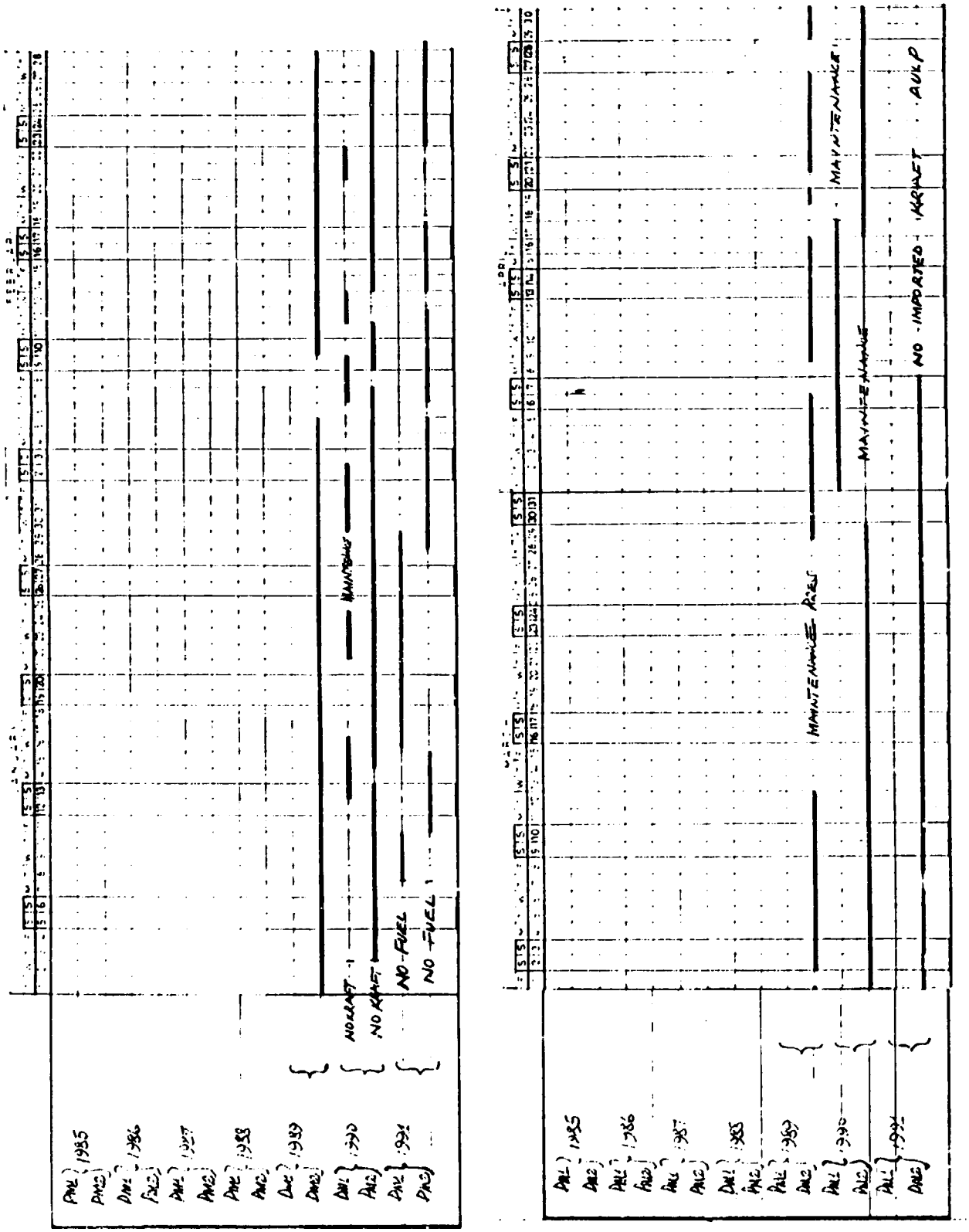
MACHINE RUN CHART page 1 of 3

(1989 - 1991)



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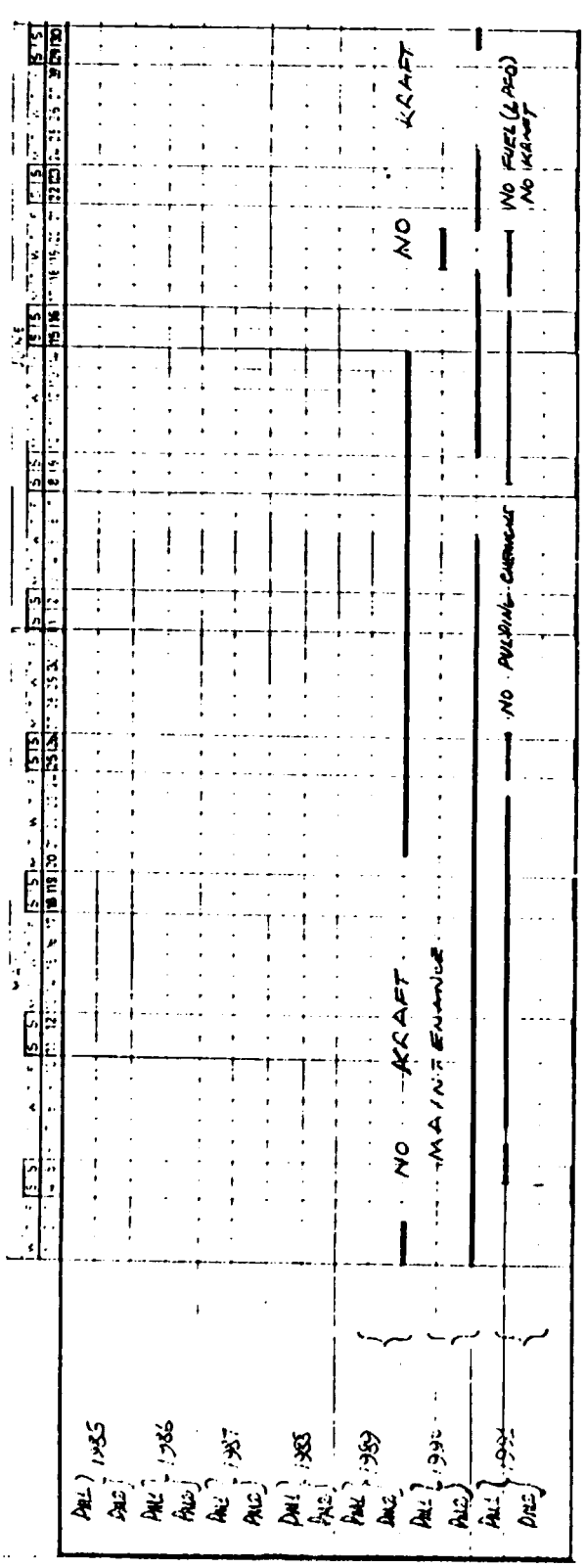
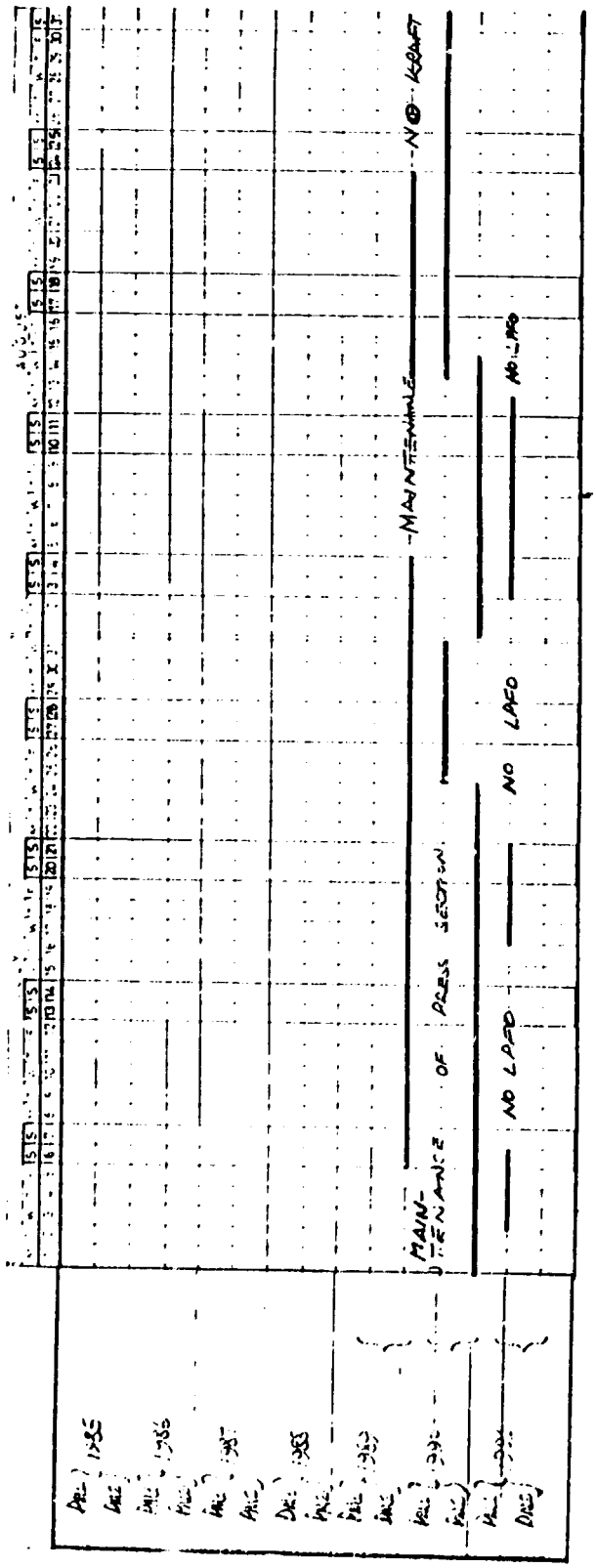
MACHINE RUN CHART page 2 of 3

(1989 - 1991)





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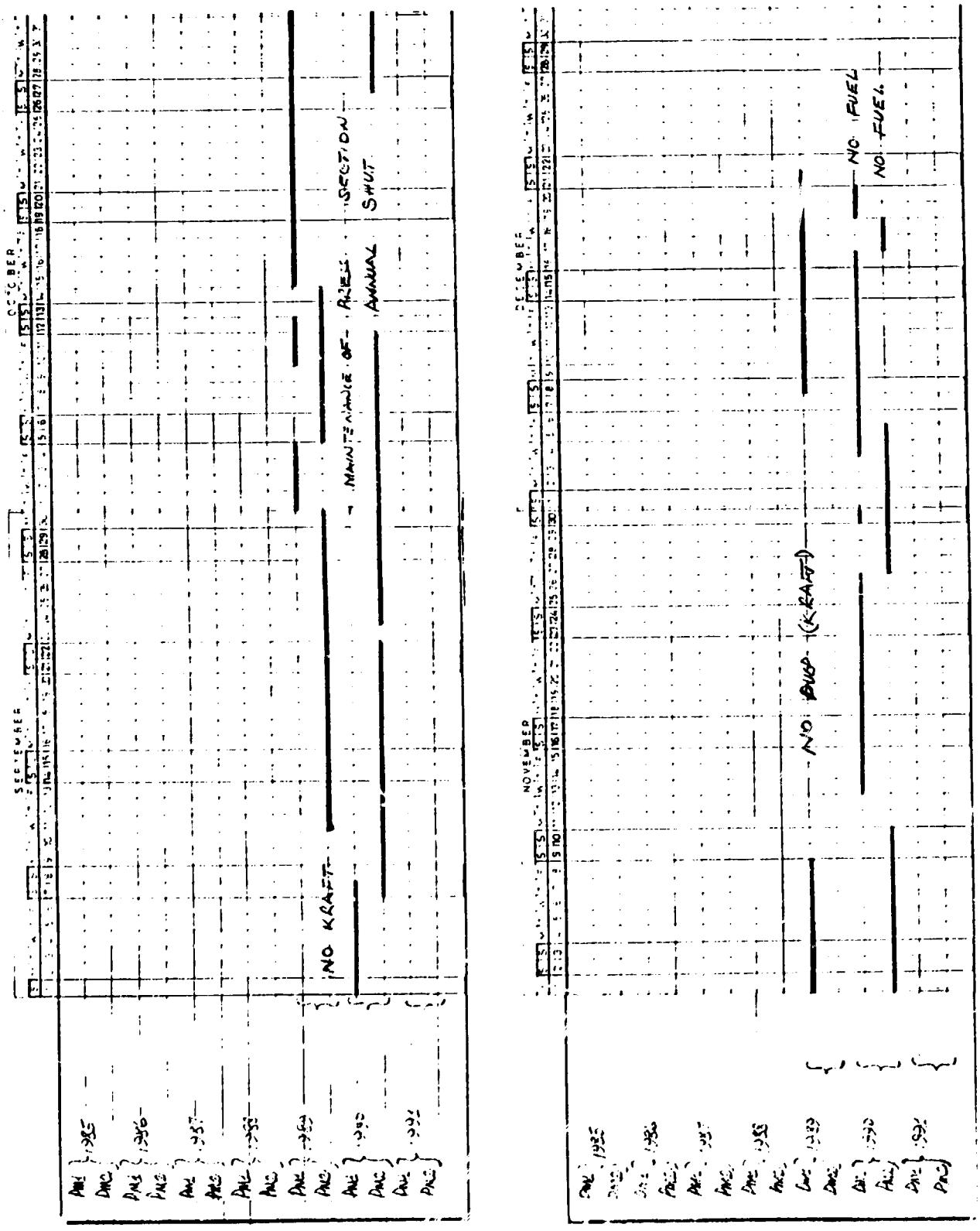
MACHINE RUN CHART page 3 of 3
(1989 - 1991)



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PULP PROPERTIES

1ST STAGE REFINED C.M.P. EVALUATION 1989 - 1991

1989	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT	OCT.	NOV.	DEC.
Freeness (m/s)	464	436		531	535	485	495	460	492	440	474	500
Tear Index (mNm^2/g)	1.91	1.57		0.99	2.42	1.42	1.59	1.44	1.34	1.38	1.58	3.45
Drainage Factor (secs)	5.88	5.70		5.95	5.85	4.55	5.5	5.7	5.3	5.73	5.22	5.7
Tensile Index (Nm/g)	12.64	11.69		6.61	8.02	6.75	10.3	10.3	8.10	6.96	8.74	8.69
Shive (%)	0.15	0.24		2.45	1.14	0.50	0.79	0.39	0.76	0.22	0.5	0.36
Coarseness (mg/m)												
1990												
Freeness (m/s)	479	487	508						577		522	504
Tear Index (mNm^2/g)	1.73	1.55	1.19						1.29		1.36	1.50
Drainage Factor (secs)	5.1	4.63	4.9						5.6		5.7	5.6
Tensile Index (Nm/g)	9.65	6.58	5.21						6.30		6.04	6.69
Shive (%)	0.58	0.52	0.90						2.41		2.43	
Coarseness (mg/m)												
1991												
Freeness (m/s)												
Tear Index (mNm^2/g)												
Drainage Factor (secs)												
Tensile Index (Nm/g)												
Shive (%)												
Coarseness (mg/m)												

2ND STAGE REFINED C.M.P. EVALUATION 1989 - 1991

1989	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Freeness (m/s)	257	255	246	277	223	220						
Tear Index (mNm^2/g)	2.55	2.08	2.36	1.58	2.10	1.86						
Drainage Factor (secs)	6.63	6.39	6.79	6.63	7.6	8.19						
Tensile Index (Nm/g)	20.34	16.77	16.01	13.95	17.31	16.72						
Shive (%)	0.008	0.053	0.07	0.42	0.036							
Coarseness (mg/m)	--	--	--	--	0.186							
1990												
Freeness (m/s)	--	220	254	--	--	--	--	--	--	--	256	245
Tear Index (mNm^2/g)	--	1.65	1.78	--	--	--	--	--	--	--	1.89	2.08
Drainage Factor (secs)	--	7.29	6.73	--	--	--	--	--	--	--	6.97	7.04
Tensile Index (Nm/g)	--	12.40	12.14	--	--	--	--	--	--	--	13.25	14.80
Shive (%)	--	0.15	0.08	--	--	--	--	--	--	--	0.22	0.22
Coarseness (mg/m)	--	--	--	--	--	--	--	--	--	--	0.105	0.092
1991												
Freeness (m/s)	262	240	251	243	255	223	273					
Tear Index (mNm^2/g)	1.72	1.79	1.75	2.00	0.66	2.01	1.94					
Drainage Factor (secs)	6.54	6.52	5.46	5.03	5.02	6.07	--					
Tensile Index (Nm/g)	12.25	13.0	11.4	11.9	3.7	11.7	12.3					
Shive (%)	0.21	0.04	0.204	0.447	0.034	0.540	0.093					
Coarseness (mg/m)	0.105	0.119	--	--	--	--	--					

3RD STAGE REFINED C.M.P EVALUATION 1989-1991

1989	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Freenes (mls)		112	156	152	123	129				128	124	
Tear Index (mNm^2/g)		2.78	2.86	2.49	2.75	2.34				2.16	2.69	
Drainage Factor (Secs/g)		9.18	8.07	8.80	10.87	12.4				10.78	9.4	
Tensile Index (Nm/g)		23.16	21.65	22.4	22.3	18.28				19.98	22.95	
Shive (%)												
Coarseness (mg/m)					0.199	0.189				0.152	0.169	
1990		3RD STAGE HAND SHEET TEST RESULTS MONTHLY AVERAGE										
Freenes (mls)		126	102						196	142	120	120
Tear Index (mNm^2/g)		2.03	2.01						2.06	2.24	2.45	2.53
Drainage Factor (Secs/g)		8.6	8.56						6.9	9.1	10.28	11.74
Tensile Index (Nm/g)		17.1	16.97						16.67	19.87	18.76	20.2
Shive (%)												
Coarseness (mg/m)									0.223	0.072	0.102	0.108
1991												
Freenes (mls)	132	129	135	136	116	117	134					
Tear Index (mNm^2	2.50	2.21	2.02	2.50	1.09	2.51	2.30					
Drainage Factor (Secs/g)	7.96	8.29	6.69	5.85	5.87	-	-					
Tensile Indes	15.97	17.3	16.1	15.8	7.2	16.4	15.0					
Shive (%)												
Coarseness (mg/m)	0.092	0.120										

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PAPER PROPERTIES

90 (48.8 G.S.M.)

PAPER PROPERTIES	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
GRAMMAGE (g/m^2)	49.0	49.0	49.0	49.3	49.1	48.8	49.3	49.2	49.2	49.13	48.72	48.88
MOISTURE (%)	4.8	5.0	5.2	5.5	5.4	5.1	5.0	5.3	5.9	5.51	5.47	5.34
TEAR INDEX (mN m^2/g)	4.35/ 5.00	4.21/ 4.85	4.03/ 4.44	4.30/ 4.96	3.68/ 4.15	4.88/ 5.82	3.94/ 4.85	4.60/ 5.31	4.76/ 5.73	4.91/ 5.50	4.80/ 5.85	5.60/ 6.47
TENSILE INDEX (Nm/g)	34.6/ 16.5	31.9/ 14.5	26.2/ 13.4	32.2/ 15.0	31.3/ 14.6	41.8/ 17.7	37.7/ 17.3	37.4/ 16.3	45.22/ 18.14	33.61/ 15.95	33.98/ 15.97	38.23/ 19.28
SMOOTHNESS (Ml/min)	298/ 356	301/ 335	254/ 293	280/ 345	272/ 328	286/ 354	308/ 366	339/ 421	717/ 912	283/ 370	268/ 336	328/ 428
BRIGTHNESS (%)	58.9	56.8	59.7	59.0	58.3	56.8	59.6	58.8	57.80	54.28	55.35	57.71
BULK DENSITY ($Um/m^2/g$)					1.87		1.97	2.0	1.87	1.85	1.84	1.89

90 (60 G.S.M.)

MONTHS / PROPERTIES	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
GRAMMAGE (g/m^2)					62.55		56.88	50.90			59.9	59.73
MOISTURE (%)					7.3		6.27	7.1			4.4	5.0
TEAR INDEX (mN m^2/g)					3.33/ 3.63		4.24/ 4.89	4.85/ 5.57			6.39/ 7.88	5.35/ 6.32
TENSILE INDEX (Nm/g)					24.55/ 13.0		31.28/ 14.55	30.60/ 13.50			39.6/ 17.50	31.33/ 14.60
SMOOTHNESS (Ml/min)					26.5/ 309		344/ 431	440/ 564			301/ 405	306/ 396
BRIGHTNESS (%)					62.05		61.02	57.30			58.3	59.87
COBB (g/m^2)					23/29		21/26				47/50	28/31
BULK DENSITY (Um/m2/g)					1.73		1.99	2.14			1.85	1.98

90 (75 G.S.M.)

PROPERTIES	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
GRAMMAGE (g/m^2)					75.58		60.06	74.57	75.30		73.80	
MOISTURE (%)					5.88		6.04	6.13	4.73		5.5	
TEAR INDEX (mN m^2/g)					3.96/ 4.50		4.73/ 5.28	4.62/ 5.31	3.86/ 4.65		4.81/ 5.62	
TENSILE INDEX (Nm/g)					29.75/ 15.30		33.3/ 16.60	31.27/ 14.93	28.80/ 14.90		40.00/ 19.60	
SMOOTHNESS (ml/min)					307/ 426		309/ 391	389/ 523	471/ 697		416/ 585	
BRIGHTNESS (%)					58.19		58.6	59.77	60.30		59.4	
COBB (g/m^2)					18/22		28.35	18/20	21/278		31/35	
BULK DENSITY ($um/m^2/g$)					1.81		1.93	1.97	1.72		2.03	

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Annex A-5.2

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ANNEX A-5.2

ANALYSIS OF MONTHLY PRODUCTION EFFICIENCY REPORT, PAPER MACHINES, JAN'90 TO JULY'91

PM	month	avai-lable h (1)	schedu-led up h (2)	net up h (3)	(3):(2) % (4)	reel prod. t (5)	finished prod. Ft (6)	(6):(3) Ft/h (7)	% rated (7):6,8 (8)	finish. broke t (9)	fin. loss % (10)	days 22h (11)	days PM I+ II (12)	lost time % of sched.up mech (13)	elec (14)	insh (15)	ops (16)
I	Jan'90	744	172	165	96	1020	985	6,0	88	35	3,4	4/9	8	-	0,7	1,2	2,6
	Feb	672	203	180	89	1061	983	5,4	79	78	7,4	1/12	12	0,9	1,1	0,8	8,4
	Apr	720	330	289	88	1827	1741	6,0	88	86	4,7	6/12	2	0,4	3,8	0,5	7,7
	Jul	744	159	135	85	927	907	6,7	99	20	2,2	3/7	-	-	4,7	1,4	8,5
	Aug	744	388	315	81	2112	1974	6,1	90	138	6,5	2/18	1	4,9	3,8	0,3	9,7
	Sep	720	142	120	84	805	749	6,3	93	56	7,0	1/7	2	-	4,0	-	11,8
	Nov	720	331	245	74	1528	1382	5,7	84	146	9,6	0/16	2	7,7	8,9	-	9,4
	Dec	744	333	316	95	1978	1815	5,7	84	163	8,2	8/18	5	-	1,8	-	3,4
	Jan'91	744	323	291	90	1838	1606	5,5	81	232	12,6	3/17	1	0,1	1,5	-	9,0
	May	744	491	401	82	2603	2333	5,8	85	270	10,4	1/23	-	2,7	2,0	0,5	13,1
	Jun	720	no data received														
	Jul	744	200	155	78	1023	939	6,1	90	84	8,2	1/13	-	0,5	2,5	1,4	18,3
II	Jan'90	744	584	490	84	3036	2881	5,9	87	155	5,1	5/28		0,8	2,9	0,8	11,6
	Feb	672	568	479	84	3044	2931	6,1	90	113	3,7	3/28		1,0	1,2	0,6	12,9
	Mar	744	685	620	91	3944	3912	5,3	93	32	0,8	12/30		0,7	2,2	0,5	6,0
	Apr	720	286	210	73	1367	1374	6,6	97			1/15		5,6	5,4	0,2	15,5
	May	744	605	513	85	3300	3232	6,3	93	68	2,1	3/31		0,9	2,0	0,1	12,0
	Jun	720	405	379	94	2378	2310	6,1	90	68	2,9	7/23		-	0,8	0,2	5,4
	Jul	744	506	465	92	2951	2907	6,3	93	44	1,5	8/24		0,2	0,9	0,7	6,3
	Aug	744	327	295	90	1855	1745	5,9	87	110	5,9	7/14		0,6	1,2	1,0	6,8
	Sep	720	479	381	80	2429	2319	6,1	90	110	4,5	3/24		1,4	8,0	0,6	10,9
	Oct	744	294	249	85	1570	1478	5,9	87	92	5,9	1/16		1,8	2,9	-	10,7
	Nov	720	309	244	79	1538	1432	5,9	87	106	6,9	2/15		5,4	4,6	-	11,1
	Dec	744	125	95	76	500	454	4,8	71	46	9,2	0/7		3,7	3,5	3,3	13,2
	Jan'91	744	171	132	77	836	710	5,4	79	126	15,1	0/8		0,5	5,1	0,5	16,7
	Feb	672	595	477	80	3086	2967	6,2	91	119	3,9	4/27		2,4	17	3,4	12,4
	Mar	744	602	516	85	3640	3431	6,6	97	209	5,7	9/30		4,1	0,6	0,6	11,4
	Apr	720	175	118	67	786	720	6,1	90	66	8,4	6/8		1,1	1,2	2,7	28,1

Note: Months without operation deleted
Explanation of column numbers on separate page

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ANNEX A-5.2

Explanations of Column Headings for ible

(1) available hours per months, ie: 24 x no. of days in month

(2) scheduled operating hours, i.e: number of hours per month, scheduled for production

(3) net up hours, i.e.: effective (actual) operating hours per month

(4) (3):(2)%, i.e.: ratio of effective operating hours to scheduled operating hours per month, expressed in %

(5) reel production t, i.e.: untrimmed production in t per month

(6) finished production Ft, i.e.: salable production mFt per month

(7) (7):(3) Ft/h: salable production per effective operating hour

(8) % rated (7):6,8, i.e. ratio of hourly salable production to rated hourly production, expressed in %. Rated hourly production per machine: 100'000 Ft/a: (335 d/a x 22 scheduled hours per day x 2) = 6,8 Ft/h

(9) finishing broke t, i.e.: recyclable broke from finishing

(10) finishing loss %, i.e.: ratio of finishing broke to reel production, expressed in %

(11) days 22h, i.e.y. number of days per month during which the machine had more than 22 effective operating hours, expressed as ratio to actual operating days

(12) days PM I + II: i.e.: number of days per month during which both paper machines have operated simultaneously

(13) lost time, mechanical, i.e.: ratio of lost hours due to mechanical problems to number of scheduled operating hours, expressed in %

(14) dito for electrical problems

(15) dito for instrumental problems

(16) dito for operational problems

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NIGERIAN NEWSPRINT MANUFACTURING COMPANY LIMITED

EQUIPMENTS/SPARE PARTS REQUIREMENTS

OPERATIONS DIVISION

S/NO	DEPT/ EQUIPT NO	DESCRIPTION	PRIORITY 0 COST ₦	PRIORITY 1 COST ₦	PRIORITY 2 COST ₦	PRIORITY 3 COST ₦	REMARKS
*1	13.5628	Seal Kit for Trolley Jack					E. SP
*2	20.0000	Rotameter - KGB Mobrey					REP part
*3	20.0000	Belville Spring Washer					REP part
*4	20.2100	Ahlstrom Pump spares					REP part
*5	20.0000	Control Valve spares - ORBE					REP part
*6	20.0000	Delta Pressure Switch					REP part
*7	20.2800	Agitator spares - Lightnin					E. SP
*8	20.0000	Gapmeters - Platon					REP part
*9	20.0000	Barksdale Pressure switch					REP part
-10	20.0000	Fisher valve spares		237,597.03	75,430.68		E. SP
-11	20.2900	Davy Morris Crane Spares		437,888.61			E. SP
-12	21.2101-4	Raw Water Pump spares		309,097.81			REP part
-13	22.2000	Andritz Screen Thickener				3,807,561.7	New INV.
-14	23.2103	Parts for Hydrant Pump					REP Full
*15	26.5200	Blotter & Heating Element for Lab					REP part
*16	26.6900	Sprout Waldron Lab Ref. Plate					Rep Full
*17	26.0000	Parts for Mettler Balance					REP part
*18	26.0000	Laboratory spares					REP part
*19	27.5201	Field Control Unit for Roll Grinder.					REP Full
*20	27.5110	Knife Grinder Segment					REP part

NIGERIAN NEWSPRINT MANUFACTURING COMPANY LIMITED

EQUIPMENTS/SPARE PARTS REQUIREMENTS

OPERATIONS DIVISION

			PRIORITY				
			0	1	2	3	
S/NO	DEPT/ EQUIPT NO	DESCRIPTION	COST				REMARKS
			₦	₦	₦	₦	
*21	27.5201	Roll Grinder Segment					REP part
*22	27.5111	Grinding Wheel for Tool & Cutter Grinder.					REP part
*23	27.5201	Vinta Press. cutting saw					REP part
*24	27.0000 27.0000	Vibrometer space Signal Generator					REP part
*25	29.5104	HPC Compressor Belts					REP part
*26	29.5103	Compressor spares					REP part
27	31.2600	Main Chain Conveyor	735,098.87				REP Full
28	31.2600	Falk Coupling	193,722.63				REP Full
29	31.6001	Knife Chipper spare		239,592.59			REP Full
*30	31.5100	Pettibone Carrylift part					REP part
31	45.5900	Refining Segments	1,175,572.7		2,469,327.00		REP (P)
*32	45.5203	Vibratory Discharger					REP Full
*33	45.5901	Power Transducer for Refiner motor.					E. SP
*34	45.5301	ASSA Oil Lubricator					REP Full
*35	45.5901	Refiner Oil Pump Coup.					REP part
*36	45.2800	V Ring Impregnator agitator					REP part
*37	45.5901	Transformers					REP part
*38	45.5901	Refiner Disc Pos. Transducers					REP Full

NIGERIAN NEWSPRINT MANUFACTURING COMPANY LIMITED

EQUIPMENTS/SPARE PARTS REQUIREMENTS

OPERATIONS DIVISION

S/NO	DEPT/ EQUIPT NO	DESCRIPTION	PRIORITY 0 COST	PRIORITY 1 COST	PRIORITY 2 COST	PRIORITY 3 COST	REMARKS
			₦	₦	₦	₦	
*39	57.2111	Mech Seals for CENT Pump					REP part
*40	61.5201	Fuel Oil Pump parts					
*41	61.5600	Spirax Temp. Control Valve					
*42	61.5201.08	Geared Pump spares					
*43	62.0000	Saunders Demin Valve					
*44	62.2107	Caustic Soda Metering Pump					
*45	62.2106	Sulph. Acid Metering pump					REP Full
-46	62.6201	Halberg pump parts					
*47	62.0000	Protective Clothing					
-48	62/63.0000	KKK parts for Turbine			29,292.32		Replacement (Part)
-49	63.0000	Crossby Valve for Boiler				566,896.38	Replacement (Part)
*50	63.0000	Boiler Curve Relay					
*51	63.5501	F.D. Fan spares					
*52	63.5201	Stratified Mica BLR Burner					
*53	63.0000	Press. Gauges for BLR					
*54	63.5201	Burner spares					Rep (Part)
*55	63.5103	Actuators					Rep. (part)
-56	65.5501	Parts for Cooling Tower	611,005.15				Rep. (Part)
*57	65.5101	Power Card for T/A					Rep. (Part)
*58	65.2700	Power Transducer for Station control room.					Rep. (Part)

NIGERIAN NEWSPRINT MANUFACTURING COMPANY LIMITED

EQUIPMENTS/SPARE PARTS REQUIREMENTS

OPERATIONS DIVISION

S/NO	DEPT/ EQUIPT NO	DESCRIPTION	PRIORITY 0 COST ₦	PRIORITY 1 COST ₦	PRIORITY 2 COST ₦	PRIORITY 3 COST ₦	REMARKS
*59	65.2700	AVR for Turbine Control					Rep. (Part)
*60	65.5102	Solenoid for Woodward Governor					Rep. (Part)
*61	65.5501	Turboflex 530 Blades					Rep. (Part)
*62	65.5801/3	Woodward Governor for EMD					Rep. (Full)
*63	67.0000	H.V Circuit Breaker Sp			333,638.55		Rep. (Part)
*64	67.0000	Telemecanique spares					Rep. (Part)
*65	67.0000	3.3KV Starter spares					Rep. (Part)
*66	67.0000	ASEA 55KW Elect. motor					Rep. (Full)
*67	67.0000	Motor Protection Relay					E. SP.
*68	67.0000	H.V. Switch Disc. & Insulators				38,130.12	E. SP.
*69	67.0000	Timers etc.					E. SP.
*70	67.0000	DC Motors Interpole Coils				311,857.94	E. SP.
*71	711.570	Swivel Joint (Dorr Oliver)					E. SP.
*72	721.6305	Recovery Top S/Roll			379,607.84		Spare
*73	721.6302	Recovery Suction Press Roll		778,884.48			Spare
*74	721.6300	New Press Granite Roll	1,248,337.7				E. SP.
*75	721.0000	Sheahan Carrier Rope		164.847.10			Spare
*76	721.0000	Synthetic Bath Mesh		195,564.17			Rep. Full
*77	721.0000	Forming Fabrics	963,032.47				Rep. Full
*78	721.5800	Parts for Celleco Cleaner					Rep part
*79	721.2125	Parts Dyestuff Metering Pump					Rep. Full

NIGERIAN NEWSPRINT MANUFACTURING COMPANY LIMITED

EQUIPMENTS/SPARE PARTS REQUIREMENTS

OPERATIONS DIVISION

S/NO	DEPT/ EQUIPT NO	DESCRIPTION	PRIORITY 0 COST	PRIORITY 1 COST	PRIORITY 2 COST	PRIORITY 3 COST	REMARKS
			₦	₦	₦	₦	
80	721.6305	Planetary Gear parts					(REP) Part
81	721.6302	Air Cylinder & Spare for PM					E. SP.
82	721.8101	Siemens Elmo Vac Pump spares					E. SP.
83	721.6200	Wire Trim Jet Nozzle					(REP) part
84	721.2118	Tool Kit for VHP pump - REISS					(REP) part
85	721.7201	Parts for Scan pump					(REP) part
86	721.6900	D.C motor Brush Spring					(REP) part
87	721.6800	Insert Valve for Knife block					(REP) part
88	721.7200	Glass & Seal for Condensate System.					(REP) part
89	721.6900	Tacho Genenrator for DC Drive					(REP) part
90	721.6800	Wichita Brake parts for Slitter Winder					(REP) part
91	721.7200	Pneumatic Pilot valve					(REP) part
92	721.0000	Various PM spares					(REP) part
93	721.6900	D.C Drive spares					(REP) part
94	721.6202	Rotor for D.C Drive					E.SP.
95	721.6400	Autoguide parts for PM					(REP) part
96	721.6600	Lifting Jack spares					(REP) part
97	721.6800	B.C.I Winder Belt					(REP) part

NIGERIAN NEWSPRINT MANUFACTURING COMPANY LIMITED

EQUIPMENTS/SPARE PARTS REQUIREMENTS

OPERATIONS DIVISION

			PRIORITY				
			0	1	2	3	
S/NO	DEPT/ EQUIPT NO	DESCRIPTION	COST				REMARKS
			₦	₦	₦	₦	
*98	721.6800	Press Regulator for Slitter Winder					(REP) part
*99	81.5300	Spares for Slitter/Rewinder-Jagenberg					(REP) part
100	81.6200	Core Winding Belts					(REP) part
101	General	Michelin Tyres Tubes				400,000	(REP) part
	APROX VALUE FOR ROs CIF *		1,694,672.0	1,694,672.0	1,694,672.0	-	
	TOTAL VALUE FOR EACH PRIOTITY GROUP ORDER		6,668,852.2	4,049,143.6	5,245,597.4	5,086,615.9	
		GRAND TOTAL =	₦ 21,049.580.00				

KEY

* = REPLACEMENT ORDER. IN EACH PRIORITY GROUP RO AMOUNTS TO £80,000 OR ₦1,694,672.00

REP PART = REPLACEMENT PART

REP FULL = REPLACEMENT FULL

E. SP. = ESSENTIAL SPARES

NEW INV = NEW INVESTMENT

NIGERIAN NEWSPRINT MANUFACTURING COMPANY LIMITED

EQUIPMENTS/SPARE PARTS REQUIREMENTS

FORESTRY DIVISION

NO	DEPT/ EQUIPT NO	DESCRIPTION	PRIORITY 0	PRIORITY 1	PRIORITY 2	PRIORITY 3	REMARKS
			COST				
			₦	₦	₦	₦	
1	30.5700	Sisu Logtruck parts	463,504.7	451,311.4		1,596,532.3	E. SP.
2	30.5125	Chain Saw spares		164,847	81,344.2		E. SP
3	30.5101	Lokomo spares	389,924.7				E. SP.
4	30.0000	Michelin Tyres & Tubes		2,149,469	1,693,275.4		E. SP.
5	30.0000	Mountain Logger Engine spare		1,500,000	500,000*		REP. FULL
		TOTAL OF EACH GROUP	853,429.4	4,265,627.4	2,274,619.6	1,596,532.3	
		GRAND TOTAL		8,990,208.7			

KEY:

* = EST PRICE FOR 5 ENGINES

E. SP = ESSENTIAL SPARES

RES. FULL = REPLACEMENT FULL

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	BEFORE CLARIFIER				AFTER CLARIFIER				AFTER ATTACHED GROWTH				FINAL			
MONTH	PH	TEMP (°C)	SUSP SOLIDS (ppm)	LOSSES (Tonns/Day)	PH	TEMP (°C)	SUSP SOLIDS (ppm)	COD (mg/l)	PH	TEMP (°C)	SUSP SOLIDS (ppm)	COD (mg/l)	PH	TEMP (°C)	SUSP SOLIDS (ppm)	COD (mg/l)
JAN' 89	6.75	40.5	657.9	18.68	6.7	38.1	115	196.2	7.1	28.6	13.5	93	-	26	17	3.11
FEB' 89	7.4	40.8	793	23.69	7.4	39.95	95.67	33.59	7.43	30.24	28.87	127.7	7.45	28	22.67	3.05
MAR' 89	6.9	38.75	684.4	11.56	6.9	37.65	105.5	123	7.6	31.65	29.65	13.6	7.2	27.6	34.67	2.08
APR' 89	7.19	37.33	701.1	-	6.95	36.98	144.73	397.8	7.53	30.8	17.03	127.8	7.2	29.5	22	3.4
MAY' 89	6.78	41.2	991.7	26.803	6.89	40.5	92.5	373	7.4	31.3	16.3	31.65	6.95	30	13	4.69
JUN' 89	6.6	37	820.6	19.659	6.75	37.4	51.4	304	7.3	31.5	19.2	43.2	6.7	30	38	9.6
JUL' 89	6.88	33.95	1102	30.692	6.78	32.9	70.7	186	7.4	28.9	10.7	37.1	6.8	267	35.3	12.8
AUG' 89	7.0	38.3	845	18.868	7.0	37	80.3	226.3	7.4	29.7	28.3	76.6	7.2	26.5	48.5	5.89
SEP' 89	7.45	35.8	326.2	7.713	7.3	35.2	49.3	213.3	7.4	30.5	36.2	65.07	-	-	-	5.68
OCT' 89	7.0	40.5	647.9	14.000	6.9	39.3	70.3	273.3	7.3	31.7	11.72	108.4	6.7	27.7	34.3	6.08
NOV'89	7.8	36.9	604.5	15.013	7.5	35.4	50	204	7.7	30.1	31.3	105.6	7.1	28.5	38	4.32
DEC' 89	7.6	42.3	463	9.222	7.4	40.9	140.9	8595	7.6	29.9	12.4	74.4	7.6	29	7	4.05
JAN' 90	7.5	42	792	24.171	7.9	39	111	196.2	7.6	31	30	67.75	6.93	28.5	16.75	5.28
FEB. 90	7.654	41.294	1189.5	35.715	7.48	39.74	106	335.9	7.64	31.194	24.97	61.1	7.7	29.5	9	8.9
MAR '90	7.23	42.9	1260	29.491	7.1	42.7	123.6	128	7.5	32.2	35.0	61.2	7.0	30.6	8.7	3.05
APR '90	6.7	40.4	960	23.379	6.6	39.5	85.7	397.8	6.9	42.6	41.8	49.0	6.4	29.3	14	2.6
MAY '90	7.1	40.6	722.8	17.174	6.9	33.8	106.2	373	7.3	31.6	25.8	81.408	7.4	27.3	33.0	2.96
JUN '90	6.97	39.2	801	18.693	7.1	37.4	116.8	304	7.3	30.8	23.9	94	6.8	28	87	4.33

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JULY 90	7.23	39.02	568.84	12.14	7.194	38.6	88.994	186	7.43	29.64	28.38	100.75	6.7	27	73	4.46
AUG' 90	7.27	31.6	425.2	13.989	-	-	-	-	7.44	28.2	46.4	70.2	6.73	26.25	17	3.51
SEP' 90	7.2	30.3	482.6	9.522	7.2	31.3	57.6	200	7.28	28.7	42.93	87	6.5	26.5	44.5	3.84
OCT' 90	8.0	37.6	307.6	12.015	-	-	-	-	7.4	29.6	35.2	85.15	7.0	-	39	4.09
NOV' 90	7.12	39.38	632.6	23.415	-	-	-	-	7.3	30.72	39.36	88.36	6.1	30.3	78	3.9
DEC'90	7.367	41.367	651.33	18.536	-	-	-	-	7.5	32.6	59.93	107.2	6.6	-	148	2.53
JAN' 91	6.6	38.9	535	11.155	6.5	39.2	134	181	7.5	30.1	64.4	95.27	-	-	71	2.31
FEB' 91	6.6	42.7	738.5	15.226	7.05	40.7	49.7	246.1	7.17	32.9	63	148.9	6.9	28	71	4.57
MAR' 91	6.64	42.9	886	21.367	7.3	34	40	-	7.3	32.6	112.1	137.53	7.3	28.5	130	3.36
APR' 91	6.8	37	513	18.554	7.4	35.5	130	-	7.2	30.5	100	111.2	6.8	29	70	3.84
MAY' 91	7.35	38.9	842.5	16.943	7.03	38.5	132.5	293.5	7.2	31.3	48.8	82.6	7.6	28	107.3	4.86
JUN' 91	7.8	39.3	466	12.684	8.1	37.3	96	306	7.2	31.2	28.7	96	7.0	-	123	6.16
JUL' 91	6.9	35.3	994	22.553	7.5	35.7	71	324	7.0	29.8	36	81.6	7.0	29.8	5.48	5.48

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INPUT DATA - FINANCIAL ANALYSIS

Client: Nigerian Newsprint Manufacturing Company Ltd.

91/08/15/RST

FINANCIAL ANALYSIS IN 1000 US$	1	
PROJECTION IN NOMINAL TERMS	1	
	0	
Exchange Rate July 1991 1US$ =	11.33	Naira
Exchange Rate July 1991 1BPS =	19.01	Naira

PRODUCTION PLANNING

1. Basic Specifications and Process Data

Share of Bleached Long Fibre Pulp	18%	
Share of Bleached Short Fibre Pulp	82%	
Fibre Losses Pulp Mill	5%	
Paper Losses Paper Mill	4%	
Clay Filler	30	kg/fmt
Water content of Pulp (adt)	10%	
Moisture Content of Paper	4%	

2. Material Balance		Capacity Level	1991	1992	1993	1994	199
2.1 Output							
Paper Mill							
o Paper Production Target	fmt/d	300	240	240	240	240	24
Pulp Mill							
o Total Pulp	adt/d	323	257	257	257	257	25
	bdt/d	291	231	231	231	231	23
o Bl SF Pulp	adt/d	265	210	210	210	210	21
	bdt/d	239	189	189	189	189	18
o Bl LF Pulp	adt/d	58	46	46	46	46	4
	bdt/d	52	42	42	42	42	4
2.2 Input to Paper Mill							
Paper Mill							
o Total Pulp	adt/d	323	257	257	257	257	25
	bdt/d	291	231	231	231	231	23
o Clay	t/d	9	9	9	9	9	
2.3 Pulp Mill Production Target							
o Bl SF Pulp	adt/d	279	222	222	222	222	22
	bdt/d	249	197	197	197	197	19
2.4 Production Losses							
o Pulp Losses	adt/d	14	11	11	11	11	1
	bdt/d	10	8	8	8	8	
o Paper Losses	fmt/d	13	10	10	10	10	1

3. Pulpwood Requirements

3.1 Specification of Pulpwood

o Type of Pulpwood	Gmelina
o Average Specific Weight (t/m3 sub)	0.350

3.2 Quantity Requirements

o 1000 m3 sub

o 1000 mt

	Year	1991	1992	1993	1994	199
4. Production of Bleached SF Pulp						
Capacity (adt per day)	300					
Capacity (bdt per day)	270					
Capacity Utilization		73%	73%	73%	73%	73
Working Days per Year	335					
Production (1000 bdt)		66.1	66.1	66.1	66.1	66.
5. Production of Paper						
Capacity(mt per day and paper m/c	150					
Number of Paper Making Machinery	2					
Capacity Utilization		80%	80%	80%	80%	80
Working Days per Year	335					
Production (1000 fmt)		80.4	80.4	80.4	80.4	80.
Sales (1000 fmt)		71.5	80.4	80.4	80.4	80.

SALES / MARKETING DATA

1. Product Mix

o Newsprint 49g/m2	80%
o Mechanical Printing 60g/m2	10%
o Mechanical Printing 75g/m2	10%

2. Product Prices (Ex-Factory)

	Naira/m.t.	US$/m.t.
o Mechanical Printing 60 g/m2	7,000	618
o Mechanical Printing 75 g/m2	6,900	609
o Newsprit 48.8 g/m2	7,200	635

WORKING CAPITAL REQUIREMENTS

Pulp Wood Stock (month)	1
Local Material Stock (month)	2
Imported Material Stock (month)	6
Work in Process (days)	10
Finished Goods Stock (month)	1
Trade Debtors (day)	0
Trade Creditors (days)	0
Min. Cash Requirements (days)	30

MATERIAL REQUIREMENTS AND COSTS

	Unit Costs				Material Requirement	Material Costs
1. Production of Pulp	CIF Lagos	Local Costs	Total Unit Costs			
	BPS/mt	Naira/mt	Naira/mt	US$/mt	kg/bdt CMP	US$/bdt
1.1 Imported Materials						
o Sodiumcarbonate (Na2CO3)					0.0	
o Caustic Soda (NaOH) 100%			11,600	970.9	42.5	41.3
o Sodium Chloride (NaCl) 100%					0.0	
o Sodium Sulphite			14,000	1,255.7	19.9	24.6
o Sulphuric Acid (H2SO4) 100%					0.0	
o Hydrogenperoxid(H2O2)50%			19,000	1,677.0	19.9	33.4
o Chemicals for Effluent Treatm.						
						99.3
1.2 Local Materials						
o Pulp Wood (Gmelina)			190	16.8	3,455	57.9

	Unit Costs				Material Requirement	Mat.Costs
2. Production of Paper						
2.1 Imported Materials	CIF Lagos	Local Costs	Total Unit Costs			
	BPS/mt	Naira/mt	Naira/mt	US$/mt	kg/fmt	US$/fmt
Pulp						
o Bl LF Chemical Pulp (ad)			7,906	698	193	134.3
Chemicals and Additives						
o China Clay	206	1,068	4,984	439.9	30	13.2
o Rosin Size	700	2,669	15,976	1,410.0	3	4.2
						151.8
2.2 Local Materials						
o Alum (Aluminium Sulphate)	500		3,700	326.6	20	6.5
Wrapping Material						
o Kraft Paper			9,717	857.6	14	12.0
o Cores in metres/fmt			12	1.1	3	3.2
o Core Plugs in units/fmt			1.5	0.1	8	1.1

3. Material Requirements	Unit	1991	1992	1993	1994	19
3.1 Production of Pulp						
(1) Imported Materials						
o Caustic Soda (NaOH) 100%	mt	2,811	2,811	2,811	2,811	2,81
o Sodium Sulphite	mt	1,318	1,318	1,318	1,318	1,31
o Hydrogenperoxid(H2O2)50%	mt	1,318	1,318	1,318	1,318	1,31
o Chemicals for Effluent Treatm.						
(2) Local Materials						
o Short Fibre Pulp Wood (Gmelina)	mt	228,384	228,384	228,384	228,384	228,38
3.2 Production of Paper						
(1) Imported Materials						
o Bl LF Chemical Pulp (ad)	mt	15,477	15,477	15,477	15,477	15,47
o China Clay	mt	2,412	2,412	2,412	2,412	2,41
o Rosin Size	mt	241	241	241	241	24
(2) Local Materials						
o Alum (Aluminium Sulphate)	mt	1,608	1,608	1,608	1,608	1,60
o Kraft Paper	mt	1,126	1,126	1,126	1,126	1,12
o Cores	1000m	241	241	241	241	24
o Core Plugs	1000units	643	643	643	643	64
4. Total Material Costs in 1000 US$	**Year**	**1991**	**1992**	**1993**	**1994**	**199**
4.1 Imported Materials						
o Caustic Soda (NaOH) 100%		2,729.0	2,838.2	2,951.7	3,069.8	3,192.
o Sodium Sulphite		1,628.1	1,693.2	1,761.0	1,831.4	1,904.
o Hydrogenperoxid(H2O2)50%		2,209.6	2,298.0	2,389.9	2,485.5	2,584.
o Bl LF Chemical Pulp (ad)		10,799.7	10,529.8	10,259.8	10,772.8	11,311.
o China Clay		1,061.0	1,103.4	1,147.5	1,193.4	1,241.
o Rosin Size		340.1	353.7	367.9	382.6	397.
o Chemicals for Effluent Treatm.		120.6	125.4	130.4	135.7	141.
o other Chemicals		316.5	329.2	342.3	356.0	370.
Total Imported Material Costs		19,204.6	19,270.8	19,350.5	20,227.1	21,143.
4.2 Local Materials						
o Pulp Wood (Gmelina)		3,829.9	4,021.4	4,222.5	4,433.6	4,655.
o Alum (Aluminium Sulphate)		525.1	546.1	568.0	590.7	614.
o Kraft Paper		965.4	1,004.0	1,044.1	1,085.9	1,129.
o Cores		255.5	265.7	276.3	287.4	298.
o Core Plugs		85.2	88.6	92.1	95.8	99.
Total Local Material Costs		5,661.0	5,925.8	6,203.0	6,493.3	6,797.
Total Material Costs		24,865.6	25,196.6	25,553.4	26,720.4	27,941.

PERSONNEL COSTS (1000 Naira p.a.)

General Manager's Office	152.9
Forestry	2,317.2
Operation	6,951.8
Human Resource	1,221.6
Secretariat/Administration	1,453.1
Finance	1,725.9
Commerce	1,241.8
Total Cost of Personnel	15,064.2
Number of Personnel	1781
Average Medical Expenses	1,500.0 aira/Employee

COSTS OF UTILITIES AND SERVICES

1. Electric Energy and Steam

o Fuel Oil	t/fmt	1.5
o Diesel Fuel	liters/fmt	15.0

1.3 Projected Fuel Consumption

	Year	1991	1992	1993	1994	199
o Fuel Oil	t/year	120,600	120,600	120,600	120,600	120,60
o Diesel Fuel	liters/year	1,206,000	1,206,000	1,206,000	1,206,000	1,206,00

1.4 Unit Fuel Rates

Diesel Fuel	0.35	Naira/liter
Fuel Oil	550	Naira/t

2. Repair and Maintenance Services

Buildings	1%	
Machinery and Equipment	40	US$/fmt
Consumables(wires, refiner plate,felt)	37.5	US$/fmt

2. Depreciation Rates (linear depr)

Buildings	4%
Machinery & Equip 1.Year	5%
Machinery Equip after 1.Year	5%
Furniture & Office Equip.	20%
Vehicles	20%
Loose Tools	25%

3. Interest Rates

Bank Overdraft	31.0%
Old Long Term Loan	9.0%
Old Short term Loan	9.0%
New Loan	15.0%

4. Taxation and Reserves

Turnover Tax	1%
Income Tax	45%

Inflation Rates	Avg.Rate per Annum Basis: Naira	Corrected Rate p.a. a Basis: US $	Rates of Inflati 1991	1992	1993	1994	1995	1996	1997	1998
o Paper Prices	25.0%	5.0%	1.00	1.05	1.10	1.16	1.22	1.28	1.34	1.41
o imported LF Pulp		5.0%	1.00	0.98	0.95	1.00	1.05	1.10	1.15	1.21
o Gmelina Pulpwood	25.0%	5.0%	1.00	1.05	1.10	1.16	1.22	1.28	1.34	1.41
o imported Materials		4.0%	1.00	1.04	1.08	1.12	1.17	1.22	1.27	1.32
o local Materials	20.0%	4.0%	1.00	1.04	1.08	1.12	1 17	1.22	1.27	1.32
o Salaries and Wages	12.0%	2.4%	1.00	1.02	1.05	1.07	1.10	1.13	1.15	1.18
o Repair and Maintenance	25.0%	5.0%	1.00	1.05	1.10	1.16	1.22	1.28	1.34	1.41
o General Inflation Rate	28.0%	5.6%	1.00	1.06	1.12	1.18	1.24	1.31	1.39	1.46
Exchange Rate US$ / Naira			11.3	13.60	16.32	19.58	23.49	28.19	33.83	40.60
Variation of Exchange Rate		20%	1.0	1.20	1.44	1.73	2.07	2.49	2.99	3.58

NIGERIAN NEWSPRINT MANUFACTURING COMPANY LIMITED

FORESTRY COST FOR 1990

	TOTAL	BASIS	TRANSPORTATION	BASIS	LOGGING ETC.
Salaries & Wages	3,632,119.00	APPENDIX A	3,147,715.00		484,404.00
Spares for Lokomos/ Sisus	886,495.00	40%	354,598.00	60%	531,897.00
Gmelina Wood Consum-ables	93,423.00	40%	37,369.00	60%	56,054.00
Fuel, Oil & Gas	883,829.00	40%	353,532.00	60%	530,297.00
Safety Equipment/Spares	129,841.00	40%	51,936.00	60%	77,905.00
Depreciation of Forestry Equipment	1,842,377.00	40%	736,951.00	60%	1,105,426.00
Insurance	1,181,005.00	40%	427,402.00	60%	708,603.00
Maintenance	5,735,936.00	40%	2,294,374.00	60%	3,441,562.00
Other Overhead	88,535.00	40%	35,414.00	60%	53,121.00
Haulage Fees	38,000.00	-	38,000.00	-	-
Lubricants	940,568.00	40%	376,227.90	60%	564,341.00
TOTAL	₦15,452,128.00		₦7,898,518.00		₦7,553,610.00

Gmelina Wood Extracted:

Awi Department	65,883.81 MT
Edon Ndon	26,544.76 MT
TOTAL	92,428.57 MT

1. Transportation Cost per MT.

	AWI	EDON-NDON
Kilometre per trip	130 Km	410 Km
per Kilo trip ratio	24%	76%
Wood Ratio	71%	29%
Tons of Wood Carried by Vehicle per trip	16 GMT	16 GMT
Kilometre per trip	130 KM	410 KM
No. of Trips	4118	1659
Fleet Mileage	535340 KM	680190 KM
Fleet Mileage Ratio	44%	56%
Trans. Cost (Apportioned)	₦3,475,348	₦4,423,170
Transport Cost Per MT	₦ 52.75	₦ 166.63

2. Logging cost per MT:

7553610 ÷ 92428.57 = ₦ 81.72

3. Royalty per MT ₦ 15.00

SUMMARY

	AWI	EDON-NDON
Transportation Cost per MT	₦52.75	₦ 166.63
Logging cost per MT	81.72	81.72
Royalties per MT	15.00	15.00
TOTAL	₦149.47	₦263.35

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NIGERIAN NEWSPRINT MANUFACTURING COMPANY LIMITED — PERSONNEL STATISTICS BY DEPARTMENT/CATEGORY — REF.101.72.22 — AS AT JULY 31ST,1991

LOCATION	DIVISIONS/DEPARTMENTS	AS AT JUNE,1991	C A T E G O R Y						REMARKS
		ESS/ES & JS	ESS	HSS	JS	TS	CS	TOTAL	% OF SS.	%/TOTAL	
GM'S OFFICE											
	1 GM'S OFFICE	1	1	0	0	0	0	1	0.00	0.00	
IKU-IBOKU	2 COMPANY SECRETARY	1	0	1	0	0	0	1	100.00	0.05	
ISITE	3 SECURITY	201	0	7	193	0	0	200	2.49	11.38	
	4 INTERNAL AUDIT	7	0	4	3	0	0	7	66.67	0.16	
	5 COMPUTER SERVICES	9	0	4	5	0	0	9	47.86	0.38	
	6 PUBLIC RELATIONS	3	0	1	2	0	0	3	25.00	0.22	
LAGOS	7 LAGOS OFFICE	44	0	15	28	1	0	44	29.55	2.41	
	TOTAL	266	1	32	231	1	0	265	9.36	14.61	
	1 OFFICE/ADMIN.SECTION	20	0	4	17	0	0	21	18.18	0.60	
FORESTRY	DIVISION 2 LOGGING	219	0	11	208	0	0	219	4.93	12.20	
	3 AFFORESTATION	129	0	8	12	0	109	129	5.68	9.63	
	4 WORKSHOP/TRANSPORT	69	0	4	65	0	0	69	6.45	3.39	
	TOTAL	437	0	27	302	0	109	438	5.72	25.82	
OPERATIONS	DIVISION 1 OFFICE	1	0	1	0	0	0	1	100.00	0.05	
	2 WOODYARD	38	0	1	37	0	0	38	4.88	2.24	
PRODUCTIONS	3 PULP MILL	28	0	7	9	0	12	28	13.79	1.59	
	4 CHEMICAL PREPARATION	8	0	0	8	0	0	8	0.00	0.49	
	5 STOCK PREPARATION	17	0	0	17	0	0	17	13.33	0.82	
	6 ADDITIVE PREPARATION	8	0	0	8	0	0	8	0.00	0.44	
	7 PAPER MACHINE	56	0	5	51	0	0	56	8.47	3.23	
	8 FINISHING	46	0	1	45	0	0	46	1.64	3.34	
	9 F-PRODUCTS W-HOUSE	39	0	1	37	0	0	38	2.08	2.63	PRODUCTION TOTAL
	10 MILL LABORATORY	33	0	4	29	0	0	33	12.12	1.81	273
MAINTENANCE	1 POWER GROUP	71	1	9	60	0	0	70	12.68	3.88	
	2 MECHANICAL/PLANNING	163	0	22	138	0	9	160	9.70	9.03	
	3 ELECTRICAL	42	0	7	34	0	0	41	11.90	2.30	
	4 INSTRUMENTS	27	0	5	22	0	0	27	23.08	1.42	
	5 MATERIALS STORES	22	0	4	18	0	0	22	19.05	1.15	
	6 CIVIL & ESTATES	98	0	7	83	0	8	98	3.96	5.53	
	7 GARAGE	29	0	3	26	0	0	29	11.54	1.42	
	8 TRANSPORTS	82	0	3	79	0	0	82	3.57	4.60	
	9 FIRE PROTECTION	51	0	1	42	0	8	51	3.03	1.81	MAINTENANCE TOTAL
	TOTAL	859	1	81	743	0	29	853	8.13	47.76	580
FINANCE	DIVISION 1 OFFICE	0	0	0	0	0	0	0	100.00	0.05	
	2 TREASURY	8	0	6	2	0	0	8	75.00	3.44	
	3 GENERAL ACCOUNTS	10	0	7	3	0	0	10	75.00	0.44	
	4 MANAGEMENT ACCNTS	8	0	5	3	0	0	8	57.14	0.38	
	TOTAL	26	0	18	8	0	0	26	70.83	1.31	
COMMERCIAL	DIVISION 1 MARKETING	4	0	4	0	0	0	4	0.00	0.22	
	2 DOMESTIC PURCHASES	6	0	4	2	0	0	6	66.67	0.33	
	3 CLEARING & FORWARDING	1	0	1	0	0	0	1	0.00	0.05	
	TOTAL	11	0	9	2	0	0	11	72.73	0.60	
HUM-RES.	DIVISION 1 PERSONNEL	122	0	16	106	0	0	122	10.24	6.95	
	2 MEDICAL SERVICES	35	0	20	15	0	0	35	55.88	1.86	
	3 TRAINING	5	0	3	2	0	0	5	75.00	0.22	
	4 INDUSTRIAL RELATION	1	0	1	0	0	0	1	0.00	0.11	
	5 SCHOOL	25	0	4	16	0	5	25	28.57	0.77	
	TOTAL	188	0	44	139	0	5	188	32.65	9.90	

BREAKDOWN OF TRAINING BY DEPARTMENTS

DIV./DEPT.	SKILL		ORIENTATION & INDUSTRIAL SAFETY		SUPERVISORY		MANAGEMENT/ PROFESSIONAL		SUB TOTAL		TOT
	SS	JS	SS	JS	SS	JS	SS	JS	SS	JS	
PRODUCTION		66	7	19		15	2		9	100	1
MECHANICAL		15	4	45	6	5	3		13	65	
ELECTRICAL	2	3	2	4		1	3		7	8	
.../ESTATE		6	1	5		3			1	14	
INSTRUMENT		6		2			4		4	8	
LABORATORY			4	7		1	1		8	5	
POWER GROUP		2		6		6	2		2	14	
PERSONNEL		4	5	5			5		10	9	
GARAGE/MILL TRANSPORT	1	41		13			2		3	54	
MEDICAL	1		5	3			2		8	8	
FIRE/SAFETY		1	2	5			1		3	6	
SECURITY		56	1	8			2		3	64	
.../ STORES		3	1	1	2				3	4	
PURCHASING		1	1	1			1		2	2	
FORESTRY		41	4	30					4	71	
TRAINING			2				2		4	-	
FINANCE		1	1				3		4	1	
AUDITS			1							1	
PLANNING		2					2		2	2	
P/RELATIONS		1	1						1	1	
MARKETING			1						1		
COMPUTER							1		1		
LAGOS OFFICE											
STAFF SCHOOL							1		1		
GM'S OFFICE							1		1		
	4	249	43	159	8	31	38		95	437	
GRAND TOTAL	253		202		39		38		532		5

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Annex A-10

Tentative Scope of Work for Follow-up Activities

The list gives an overview of those areas and activities which are recommended to be followed up more closely in succeeding investigations and assessments.

The list is not exhaustive and may be complemented by NNMC or the respective Nigerian Authorities.

1 - Detailed market investigaion (Nigeria and neighbouring countries)

2 - Investigations on pine wood refining

3 - Comparative assessment: Contractor forestry again NNMC's forest operations, technical and economic comparison

4 - Alternative refiner plate pattern trials

5 - Soft calendering trials

6 - Examination of technical benefits of top wire addition

7 - Mill water circuit closing potential (water recycling, fiber loss reduction)

8 - Installation of an improved effluent sludge handling system

9 - Boiler conversion/adaptation for natural gas combustion

10 - Improvements of the mill's control system

11 - Establishment of detailed investment programs

12 - Extension of the present staff development program